PEST CONTROL

DECEMBER 1961

First PC Survey of Industry Economics Reveals How Business Will Be and

What PCOs Will Do in '62

Forecast Begins on Page 9

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Report of NPCA convention termite session shows differences not resolved

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RE: 7-1987
Oct. 9, 1961

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Please ship me 200 lbs. Hubsco-147 Rodent Bait.

I have been testing a 5 lb. can against several other cereal baits I have on hand. The Hubsco-147 is definitely much more attractive to mice than any other I have used. Since my exterminating work is done almost entirely in food manufacturing plants, a good anti-coagulant bait is a most important tool.

Stan Bolanovich
Stan Bolanovich

Regardless of laboratory tests, no product can be considered a success until it has met the standards of an industry. This unbiased and unsolicited letter from Mr. Bolanovich speaks for itself in praise of HUBSCO-147.

"Please ship me 200 Lbs. Hubsco-147 Rodent Bait. I have been testing a 5-Lb. can against several other cereal baits I have on hand. The Hubsco-147 is definitely much more attractive to mice than any other I have used. Since my exterminating work is done almost entirely in food manufacturing plants, a good anti-coagulant bait is a most important tool."

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All Orders shipped same day. Orders over $45 shipped charges paid. Phone Melrose 1-8028, Indianapolis, collect for rush orders.

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PEST CONTROL

December, 1961

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Year 'Round Maintenance

An ounce of prevention is worth a pound of cure. That's an adage that's pretty worn, but it's one that's followed conscientiously both summer and winter in the maintenance programs of better pest control firms. It pays off in a minimum of time lost because of equipment failures. *Preventive* maintenance is emphasized, including proper cleaning, repair, lubrication, and sheltering of that equipment. Winter maintenance is important so equipment will be ready for the busy season ahead when delays mean lower efficiency and less money.

Repairs should not be put off until equipment breaks down. Each fall you should decide what needs to be overhauled. If equipment doesn't need overhauling, clean it thoroughly, and grease it to prevent rusting or freezing. Steam cleaning is not practical for most PCOs, so they use an air compressor to spray the machinery with a solution of 5 parts kerosene with 1 part detergent. This solution should then be rinsed off with water and dried.

Preventive maintenance should also become a daily task in the summer. Some firms assign this task to one man so the responsibility can be delegated. Spray tanks should be cleaned thoroughly because of the corrosive action of some insecticides that are being used today. Expensive foggers, sprayers, and dusters should be kept indoors at night throughout the year.

Preventive maintenance is well worth performing all year 'round; maintenance that will prevent breakdowns, not maintenance that takes place after the equipment has gone out of business. How well you take care of your applicators this fall and winter will be reflected in their performance next spring and summer. Maybe it could have been better. Start a fall and winter equipment checkup program now.

Before this year ends, all of us at *Pest Control* say thanks for making this the most successful period in our history, and for your participation in the Purdue Correspondence Course. We also extend to each of you a joyous Holiday Season with your friends and family.

Kem-Oil* "250" hose is just one of many features of Hudson X-Pert® Sprayers that meet a *maximum* sprayer performance specification for professional use. This hose is chemical and oil resistant...even when immersed in a solution consisting of kerosene, benzene, toluene and xylene. Made to withstand a 1000 lb. bursting test, it operates ideally at pressures up to 250 lbs. This means longer, usable, economical hose life—less time servicing, more time spraying, less time spent repairing equipment—more time using it!

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Buy the sprayer built for professional use—the X-Pert.

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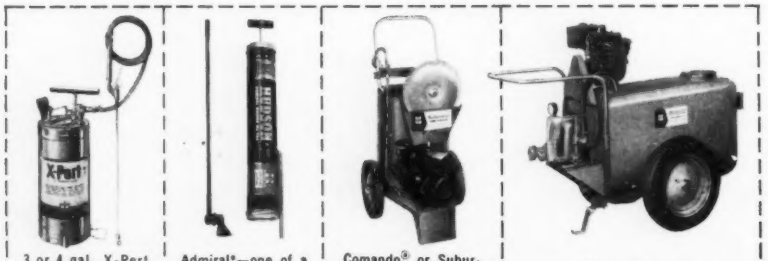

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Letters

Color and Fly Attractants

In the article by Dr. D. E. Howell entitled "Fly Baits", in your April 1961 issue, the author states, about warning colors, that tan-colored baits are the best, followed by yellow, brown, and pink. But black, dark blue, red, and deep orange are the least attractive.

We have information from well-informed sources that the best colors to attract flies are black and red. Furthermore, all fly baits we have seen on the market, made by very competent manufacturers, are black. Bayer formerly made his well-known fly bait Tugon in a red color, but has switched to black. Since the base of fly bait is white, or at least very light colored, it would be easy for the manufacturer to give it a tan or yellow or brown color if these would be so superior. To our knowledge, none has done so, and all this is quite contradictory to the statement made by Dr. Howell in his article. We would be much obliged if you would let us have your comments.

Centro Agricola

Guatemala,
South America

We asked Dr. Howell to comment on this seemingly contradictory report from this reader in our Southern Hemisphere. This is what he told us: *"The work reported in my article was carried on for a summer under natural conditions in dairy barns in Stillwater, Oklahoma, and involved over 100 replicates. Under these conditions, the results were clearcut, and tan-colored baits were distinctly more attractive. The excellent book by Luther S. West, "The Housefly," reports several color experiments from several parts of the world, which agree in general with our data. On the other hand, different conditions may cause different reactions, and effects of color need to be compared under local conditions. I would further suggest that the color of the bait should also be distasteful to children or others who might accidentally consume the bait. The need for a warning color for a bait may be stronger than the need for the greatest fly attraction."*

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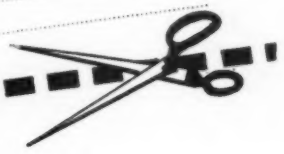

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This advertisement in Readers Digest was seen by more than 35 million people*

They eat their way to death with WARFARIN . . .*
a development of the Wisconsin Alumni Research Foundation.

A little more than 10 years ago WARFARIN was hailed as a dramatic new discovery that revolutionized the extermination of rats and mice. Since then WARFARIN has proved itself to be the safest rodenticide known, and its name has become a household word throughout the world.

Rats and mice carry at least 19 known diseases affecting men and animals, including food poisoning and typhus. In America they eat or destroy enough food to feed 10,000,000 people. For centuries they successfully outsmarted man by avoiding his traps and poisoned baits. But WARFARIN turned the tables.

WARFARIN was discovered in the laboratories of Professor Karl Paul Link at the University of Wisconsin in the course of intensive studies on the coagulation of blood. It was shown that when rats and mice eat baits with WARFARIN over a period of several days their blood cannot clot, and they die of internal hemorrhage.

Since WARFARIN baits kill rats and mice with no pain or discomfort, they never become suspicious. They keep coming back for more . . . until the entire colony is destroyed. A single dose is harmless to children, pets, birds and domestic animals. It is the *repeat-dose* requirement that makes WARFARIN the safest rodenticide in use today.

WARFARIN baits, easy to use and economical, are sold under various brand names at drug, hardware, farm supply and food stores. For your protection, look for the name WARFARIN on the label of the product your dealer carries.

WARFARIN is tested and certified by the Wisconsin Alumni Research Foundation, Madison, Wisconsin. It's sure death to rats and mice because *it kills them with kindness!*

**WARFarin—from the first letters of the Wisconsin Alumni Research Foundation.*

This story on WARFARIN, published as an advertisement, appeared in the Readers Digest for October, 1961. Here you have powerful promotion of WARFARIN directly to consumers. Follow through by formulating RAX POWDER containing .5% WARFARIN—available from Prentiss. ■ Reprints of this ad will be sent upon request.

**The circulation of the Readers Digest is 12,500,000 and each issue is seen by an average of 35,131,000 people, according to Alfred Politz Media Studies.*

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Sampling of representative leaders from coast to coast in *Pest Control* magazine's survey of industry business forecasts

PCOs Will Up Sales in '62

Hiring, Expansion, Equipment Purchase Intentions Also Revealed

90% of the PCOs interviewed by Pest Control expect increased sales in '62. 7% see no change over '61, and 3% had no opinion.

A WHOPPING 9 out of 10 of America's PCOs expect their gross sales to increase in 1962, according to a countrywide poll just completed by *Pest Control* magazine. These same industrymen say chances for fatter profit margins, however, are only about 50/50.

Not only do these optimistic pest controllers predict greater sales for themselves, but an overwhelming majority expresses confidence that the nation's economy as a whole will improve.

In a detailed questionnaire mailed to 82 representative PCOs in key locations throughout the country, PC asked for predictions of business prospects for next year, and requested facts about expansion plans and specific 1962 expenditures for vehicles, equipment, and new personnel. Other questions sought to determine how much profit PCOs will make, and what ups and downs in gross sales can be expected. More than 54% of those who received the form responded.

This mail survey confirmed the enthusiasm expressed by scores of industry members from every section of the USA, who were personally interviewed by our field reporters.

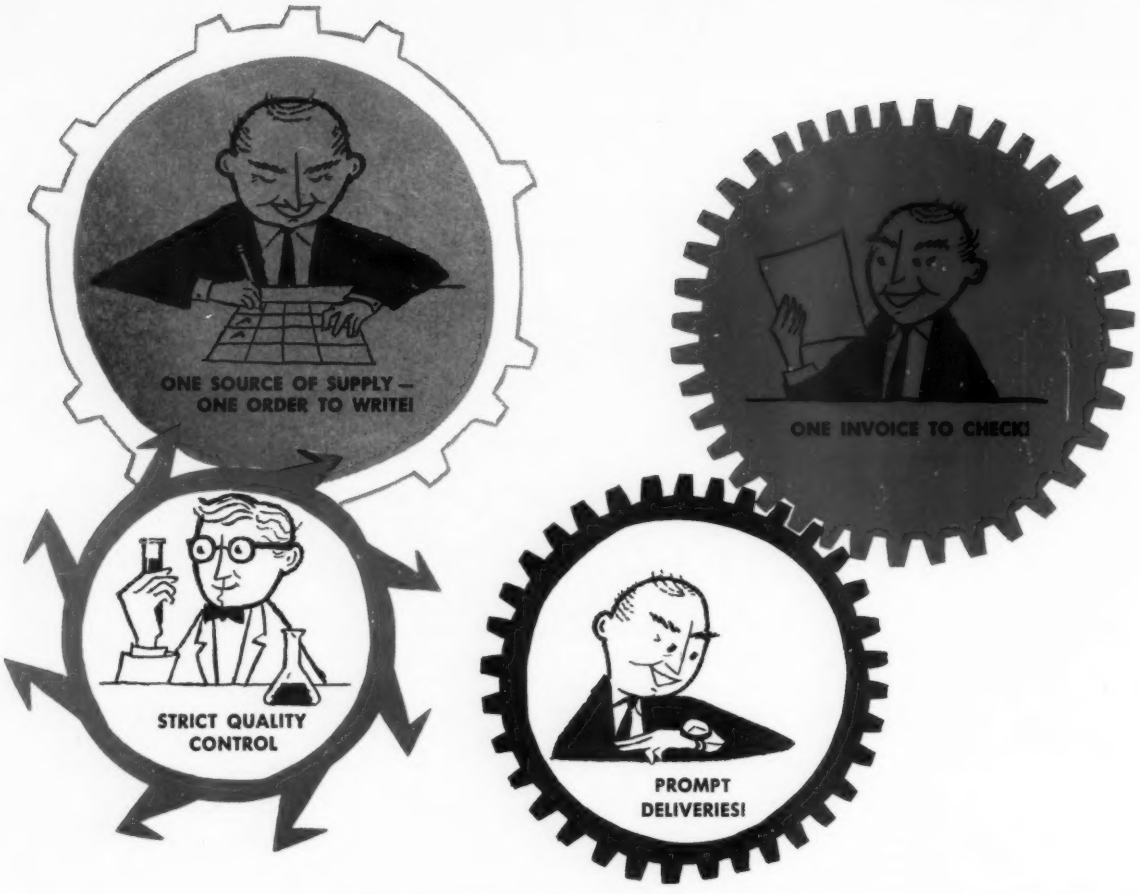
"How was business in the last half of 1961?" PC asked. A convincing 84% replied their gross was on the upgrade, and with the exception of one or two lonely cynics, all expect conditions to be better next year.

When members of this industry cross section were asked how they view the '62 business panorama in general, 82% said they are looking forward to a moderate step-up in economic activity. Only two PCOs were willing to predict a boom, but at the same time, a mere 10% felt pessimistic about prospects for a continued speedup in America's business.

See Upswing in Sales

Most impressive score of all was chalked up when PCOs were asked to gaze into the crystal ball, and predict changes in their gross income for the new year. All but 7% see the up-line on their sales charts continuing in the same direction, a forecast that's in keeping with the steady growth of service industries

This happy outlook is probably brought on by several influences aside from the normal growth in gross national product, which most Americans have come to take for granted. For one thing, the mighty hand of the Food and Drug Administration grows stronger and stronger, and likelihood of stricter pest control regulations in food warehouses and processing plants seems a certainty. Another factor that augers optimism is simply America's widespread affluence; more people can now afford regular, *preventive*, pest control service in their homes. In the South, particularly, it is even becoming fashionable, an NPCA convention-bound PCO remarked recently in Miami. With the public's mania for cleanliness, spurred by the constant prodding of TV soap and other



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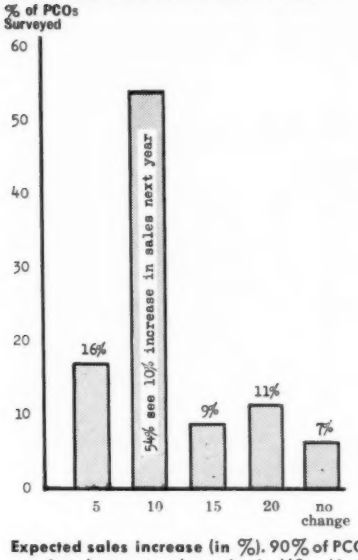
Extent of Sales Increase PCOs Predict for 1962



Expected sales increase (in %). 90% of PCOs questioned expect sales gains in '62. Above graph shows how forecasts vary.

cleanser advertisements, this home market seems destined for expansion. And chemistry is making controllable many pests that once had to be endured. Recent onslaught of products for weed and unwanted grass control is evidence in hand.

$110 for Every $100

In any case, if there's any truth in statistics, in 1962 half of the nation's PCOs will ring up $110 for every $100 brought in this year; slightly over half predict a sales gain of 10% in the year to come. Next most frequent estimate of expected sales increase is 5% (nearly a fifth favored this figure). While 11% of the businessmen anticipate a 20% gain, not one ventured a higher prediction, and 1 in 10 foresees a 15% increase in business volume. Industrywide, total service business next year should exceed $300 million.

The reason for the majority of 10% forecasts might be summed up in the comments of a PCO from the West who said, "We expect to increase our business 10%, which has been our rate of growth for the past 15 years. We find this growth can be accomplished without too much added sales cost."

This relationship between increased sales and subsequently increased costs no doubt led many of those who were interviewed or surveyed to be cautious in estimating how much would be left over. Probably the most perplexing problem on the minds of financial analysts, as well as PCOs, these days is the profit-squeeze. Every major industry in the country has felt the tightening of this relentless vise. The upward creeping cost of doing business — wages, materials, and taxes — shows little promise of subsiding.

PCOs are prudently optimistic. About half think they'll get to keep more of next year's dollar than they managed to this year. On the other hand, one-fifth expect to keep less. Of the 30% remaining, about half feel there'll be no change, and the rest are reluctant to express an opinion.

Executives of older, more established industries may say no one can expect to really increase profit margins; it's enough, many of these old-guard firms feel, to maintain a constant return on steadily increasing (they hope) sales. But pest control, relatively new, is a business rapidly reaching professional status, and the days of uncertainty, poor organization, and fly-by-night operation are disappearing.

Of course it is not absolutely necessary to raise the percentage of profit with each increase in sales, but the fact that half of these businessmen believe they will realize greater profits next year does indicate confidence in the industry's future. And it is possible, too, that those PCOs who fear lower profits next year are paying the price of expansion. Increased expenses brought on by new men, advertising, or added branches may exceed the new income they produce on the balance sheet for months, or maybe years.

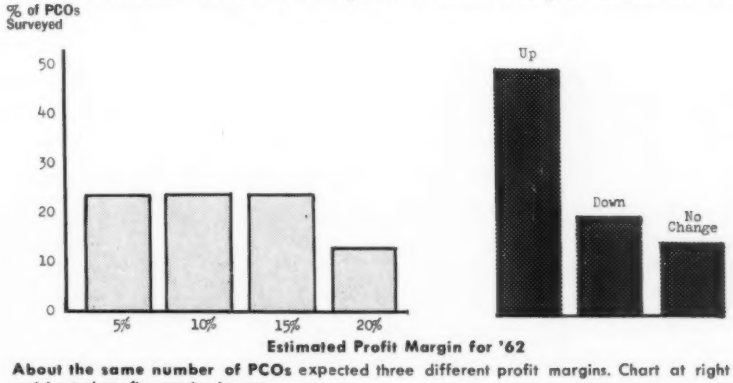
Industry members revealed a wide range of hoped-for profit margins, and one correspondent discounted the significance of such figures. "These profit margins don't mean much in closely-held companies," he said. Corporations which have few stockholders, and these mostly employed by the company, may choose not to operate at a high profit because of "double taxation."

5, 10, 15% Earnings Forecast

For the sake of economic analysis, however, profit data unearthed by *Pest Control* is of great interest. Three-fourths of the PCOs we reached through our mail survey and interviews were evenly divided among three profit estimates predicted for 1962; one-fourth anticipate a 5% profit next year, and equal numbers expect 10% and 15% return on sales. A net income of 20% of gross is predicted by 13% and nearly 15% have their eyes on 25% or more profit next year! Of this last, high-earnings group, one PCO says he'll pocket half of every dollar, and 25% and 30% levels of profit are anticipated by two men each. It is questionable whether members of this last group have taken all their expenses into consideration. Such profit margins are unrealistic when compared to other known facts about the industry, such as the low prices many PCOs are currently charging, the cost of labor and materials, and the old bug-a-boo of taxes.

If these figures prove nothing else, they show today's PCO is operating at a reasonable, almost traditional, profit margin. Profit margins will vary according to how a pest controller handles his own salary. Also, generally speaking,

How Much Profit Industrymen Think They'll Make in '62



About the same number of PCOs expected three different profit margins. Chart at right shows anticipated profit margin changes.

the larger the firm, the smaller the percent of profit The ratios reported in this survey agree with those published by the NPCA which show profit in the industry ranges from 7½ to 13 or 14%, depending on size, etc.

Discounting the few whose forecasts are more than rosy, it is apparent that expected growth in sales and profits is healthy but not spectacular. The dominance of a conservative profit margin implies that many PCOs are ploughing funds back into their business, in new equipment, offices, and personnel. They are also spending money to make their servicemen better qualified, through workshops, short courses at universities, correspondence courses, and local meetings and discussions, all of which are an investment that must come out of income.

3 New Autos Per Firm

Plans to buy new vehicles clinches the notion that PCOs aren't hedging on capital spending. Of those we contacted, three-fourths will purchase 1 or more service cars or trucks next year, and totals indicate the average purchase among those who plan to buy will be 3 vehicles each.

Average amount to be spent for service automobiles and trucks, including in the average those who plan to buy none at all, is still $5000 each. This figure will be offset somewhat by trade-ins to replace older vehicles, but the amount is substantial enough to show how PCOs intend to reinvest in their companies.

Vehicles, next to buildings, probably represent the major equipment expense a PCO has. These predictions of next year's spending for cars and trucks show concretely that PCOs are out to grow in 1962.

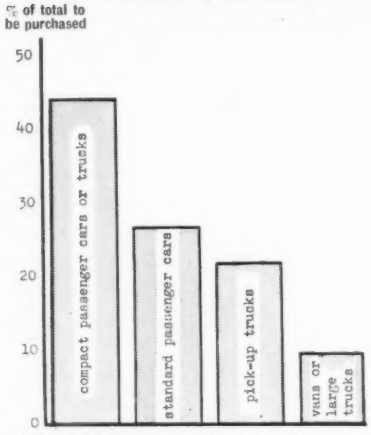
Compacts Most Popular

Of the various service vehicles PCOs across the land are looking at for next year, compacts are the most popular. These pint-size cars and trucks account for 45% of predicted purchases, with passenger cars far out in front. These smaller autos have earned a permanent place in American business, and pest control is no exception. Here is another example of the search for lower costs.

Standard size passenger cars rank second, racking up 25% of the total. One in every five new service vehicles PCOs buy next year will be a pick-up truck. Larger conveyances, such as vans and trucks, make up the balance.

Of all the PCOs *Pest Control* reached, 95% are going to buy new

Kinds of Service Vehicles PCOs Will Buy in 1962



74% of PCOs surveyed will buy 1 or more service vehicles next year. The types of autos they'll buy is shown above.

NEW BIRD REPELLENT REALLY WORKS

and... it is transparent, thus does not mar surfaces

4-THE-BIRDS is unlike any other material offered for the solution of bird problems. It represents an entirely new method of formulation and compounding. 4-THE-BIRDS was developed by the A. Z. Bogert Company, long experienced in the manufacture of non-drying adhesives.

4-THE-BIRDS has excellent stability under unusual temperature extremes...

it stays tacky down to 15° F

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and the transparent, no-run qualities prevent disfigurement of the structure.

Other Features:

- Contains no ingredient harmful to birds or other animals
- Will not affect paint, metal or other structural materials
- Easy to apply with caulking gun or putty knife
- No dark stain is left when material is wiped off...nothing shows through newly painted surface.

From Sept. 29 PHILADELPHIA INQUIRER

"Thursday was "moving day" in Doylestown for the birds, more specifically the pigeons that have been chirping happily in the comfortable autumn air in the upper reaches of the $3,500,000 Bucks County Administration Building. The product has been tested successfully on a number of Doylestown buildings including the Doylestown Trust Co., the Methodist Church, the elementary school and the Masonic Temple in Quakertown."

New profits for Pest Control Operators

Successful installations like the Doylestown case reported by the PHILADELPHIA INQUIRER indicate a substantial profit potential for PCO's. This dependable material, with unique and high desirable features, assures standards of performance that enhance the PCO's good reputation.

To them we pledge our own reputation in the field of acoustical tile adhesives where, ten years ago, we offered ACOUSTI-BOND, the new, long-lasting, non-hardening material that solved installation problems for contractors throughout the land (and made the A.Z. Bogert organization a real growth company). We invite inquiries from qualified PCO's.

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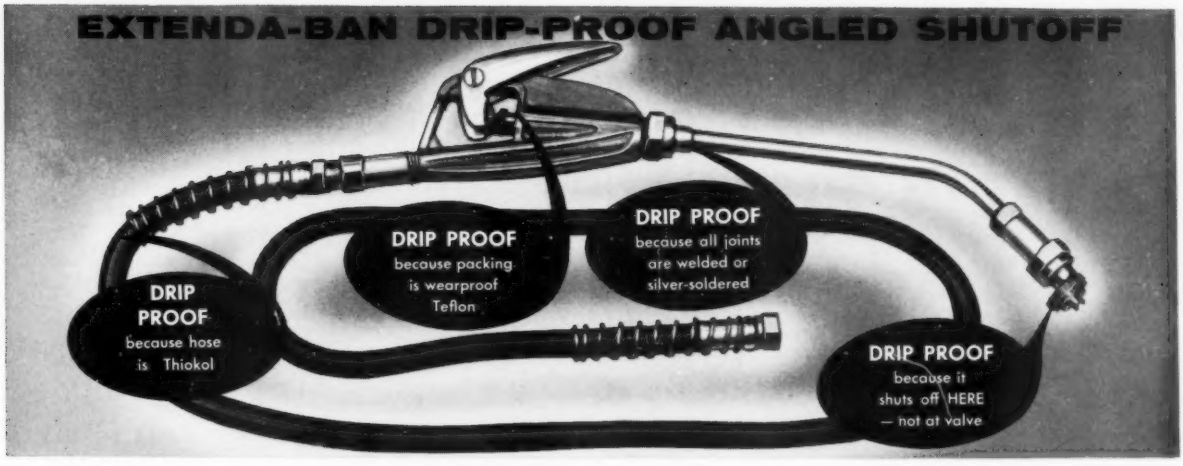
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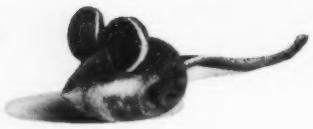

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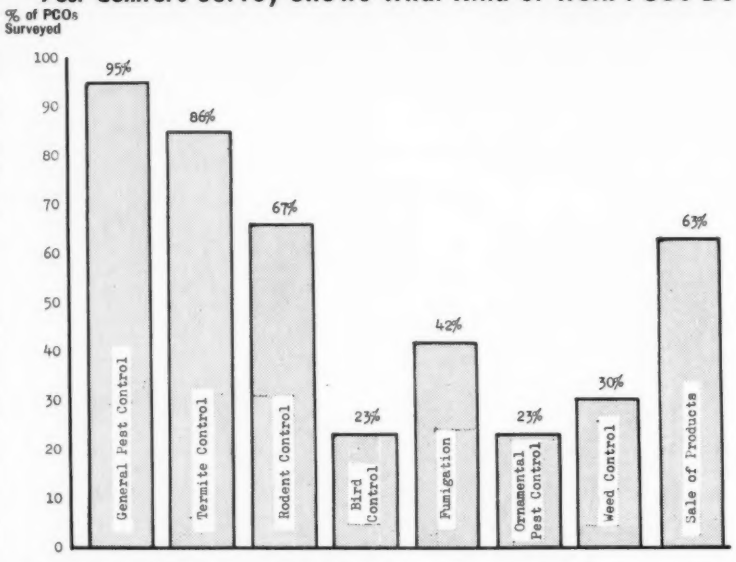
Pest Control's Survey Shows What Kind of Work PCOs Do



The pest control industry is usually divided into 8 kinds of specialized services. Above is the percentage of those surveyed who participated in each.

equipment next year. Of these, the majority will spend up to $2500 on application equipment alone, and some report they will spend more than $5,000 for sprayers, dusters, foggers, etc. This is particularly significant because the survey was oriented toward the small and medium sized operators, and the considerable sums spent by multi-million dollar operations would surely swell this figure to an impressive level.

Servicemen Galore Next Year

Earmarks of expansion were found throughout the poll. Nearly one-fourth said they would open new branches next year, and several indicated they would open more than one. Tendency is for these firms to grow into chains, with headquarters in one city and multiple branches in nearby towns. Of those polled, 5% are going to erect new buildings next year.

But the growth pattern was perhaps most dramatic of all in the field of new personnel. Plans to hire new people were revealed by three-fourths of the participants. This does not include stenographic or clerical help, or persons hired to replace present employees. Average personnel increase among those who will augment their staffs is 3 men. Servicemen make up 67% of these industry newcomers, and salesmen account for about one fourth. Branch and sales managers and technical directors make up the balance. PCOs are here following the general trend in the economy, which is gradually show-

Complete range of vehicles PCOs plan to buy next year is shown here in one man's operation Lester A. Meis, PCO from Victoria, Texas, displays his fleet, dominated by low cost, economical compacts..

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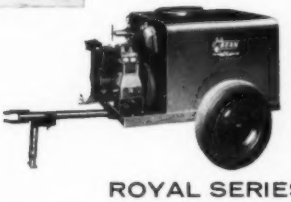

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Happy New Year!

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Sales Manager
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ing an increase in employment. But the competition for new men is going to be tough. The labor market is tightening.

A recent release from the Department of Labor shows five major areas in the nation which have advanced into the class C, or "moderate unemployment," category. These areas, which now have only 3 to 5.9% unemployed, are Baltimore, Cleveland, Flint, St. Louis, and Seattle. The report indicated that for the first time since last January, three locales are listed in Class B, which has unemployment of about 1.5 to 2.9%; these were Washington, D. C., Richmond, Va., and Madison, Wis.

Participation in Markets Analyzed

In an attempt to examine participation of the industry in its 8 most commonly accepted specialties, PC asked managers how active they are in each. The divisions, and the percent operating in each field, were (in order of frequency): (1) general pest control, 95%; (2) termite control, 86%; (3) rodent control, 67%; (4) sale of products, 63%; (5) fumigation, 42%; (6) weed control, 30%; (7) bird control, 23%; and (8) ornamental pest control, 23%.

These categories reveal how diversified most of today's operators are. More than half of all the PCOs included in the survey are in four or more categories already. When we asked them what new fields they would go into next year, the most frequently mentioned were bird, weed, and ornamental pest control.

These figures, gathered as they were from every section of the country, show increasing confidence that 1962 will be the best year on record for PCOs. How do the industry member's forecasts stack up against what other businessmen and economists are saying?

'62 GNP Up 10%

The nation's leading economists also expect 1962 will be a record-breaking year, according to a poll of 316 of these experts conducted by the F. W. Dodge Corporation, an internationally known construction news and marketing firm. It predicts gross national product will rise 10% by the last quarter of 1962.

The fact that most of these

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economists feel recovery will continue to be centered in the manufacturing sector of the economy should not disparage PCOs. The reason none of these prophets went on record for giant strides in service industries is no doubt because service industries don't fall off as fast or as much in a decline, and therefore don't have as far to bounce back. A homeowner with termites in his walls has to have them taken care of, whether we're at full employment or not. Of course, a bad business climate may put the damper on a PCO's prices.

A fairly good year for nonresidential construction is seen by most economists the Dodge Corporation polled, but they foresee another sluggish housing year. In fact, Dodge says, new housing starts engendered the least enthusiasm among economists, who hasten to assure, however, that new housing legislation is expected to help this unhappy prospect.

Construction Up 7.1%

Some hopeful figures are given by *Architectural Forum*: "Like 1961, next year will be a big one for the building industry. It is estimated that $25.1 billion will be spent on the construction of new buildings of all kinds, 7.1% more than the projected 1961 total." The journal placed '62 house construction at $17.9 billion.

In any case, termite operators should be busier next year. A spokesman for the National Association of Home Builders says this year's 1,300,000 housing starts should rise to 1,375,000 in 1962.

PCOs are in tune with the times. *Fortune* magazine polled representative executives from the four corners of the business world, and 85% are confident their sales will go up next year. This figure is significantly close to those uncovered by PC.

Profit Squeeze Predicted

In fact, most of the leading business publications agree with PCOs about sales gains, but the problem, as usual, is in profits. Although *Nation's Business* predicts corporate profits will rise another 25% over the next year and a half, the magazine adds that increased volume, not higher margins, will account for most of the rise. Actually, the journal glumly warns, the percentage of profit may drop.

PCOs who were cautious about predictions of rising net earnings reflect the feelings of most financial and economic soothsayers. One authoritative periodical says profits will be under attack next year for two reasons: first, increased earnings and fears of inflation are whetting the appetites of tax-hungry legislators, and second, unions want to share in the spoils. Another source said rising wages and increasing state and local taxes, coupled with decreases in the price of certain basic goods, such as aluminum, are putting profits on the skids.

Jobless Decrease Predicted

Just about everybody thinks a fall off in unemployment is at hand. *Nation's Business* says the jobless will slide from 7 to 4% by next Christmas, and *Fortune* sees a lower level after the turn of the year. This tightening of the labor market is extremely meaningful to PCOs, who have indicated they are going on a hiring spree during the

(*Continued on page 30*)

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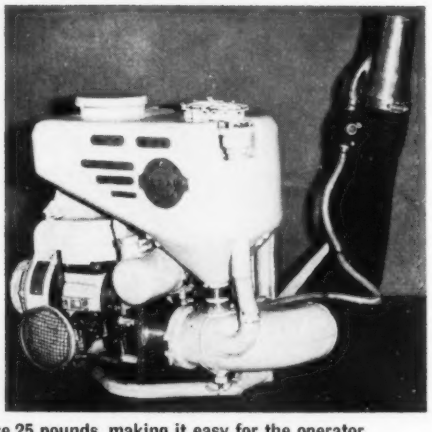

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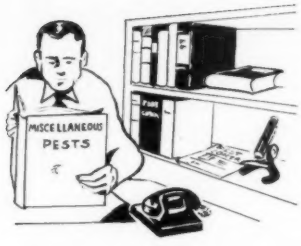

PURDUE UNIVERSITY, DEPARTMENT OF ENTOMOLOGY, WEST LAFAYETTE, INDIANA

Correspondence Course in Pest Control Technology

By DR. LEE C. TRUMAN*

Lesson No. 12

Occasional Invaders and Miscellaneous Pests

THIS LESSON includes many of the insects encountered in pest control work which are not mentioned in other chapters. For purposes of separating these many and varied pests in a way which will help you know more about them, they will be divided into two groups: occasional invaders and miscellaneous pests.

The term "occasional invaders" includes those pests which occur in buildings at some stage of their life cycle but which do not usually complete the entire life cycle within the building.

The term "miscellaneous pests" applies to those pests which usually complete their life cycle within the confines of a building. Some of them are common in many parts of the country while others may occur only in certain localized areas. Any of them may occur in great numbers in certain places.

While there may be some overlapping of these groups, the placement of a pest in the proper group will enable the pest control operator to tell his customer a great deal about the habits of a particular pest, and it will help him to carry out a good control program.

There is no one general method of control for all these pests — the pest control operator must properly diagnose and treat each individual case.

OCCASIONAL INVADERS

CLOVER MITE
***Bryobia praetiosa* Koch : Order Acarina, Family Tetranychidae**

The clover mite often becomes a serious household pest, especially in situations where new lawns have been established and where there is a heavy growth of succulent, well-fertilized grass close to foundation walls. These mites are smaller than a pin head and have front legs which are as long as the body. They often occur in extremely large numbers, and although they do not bite man or cause any damage indoors, they are extremely annoying and leave red stains when crushed. See Figure 12-A.

The clover mite does not feed exclusively on clovers. It attacks a number of grasses and certain other plants found in yards. Its migration into homes is triggered by population pressures or by the onset of unfavorable feeding conditions such as occur during periods of drought or at the onset of cold weather.

Adults lay eggs in cracks in concrete foundations, between walls of buildings, and on the underside of basal bark on trees. The mature mites frequently spend the winter in the exterior walls of houses. They are inactive during cold weather as well as during the very hot weather of midsummer. During even brief periods of warm weather, they migrate both to the outside walls of the house and to the inside, particularly on the south side of the building. They usually are noticed around windows, but they may soon overrun the entire home. Heavy migrations into houses are common both in the early summer and in the fall.

Satisfactory control of clover mites depends very much upon the thoroughness of the application of the toxicant. Although these mites may be kept away from a structure by placing a plant-free band of pea gravel or coarse sand 18 to 24 inches wide around the foundation, this is not generally a means of control which is acceptable to the homeowner.

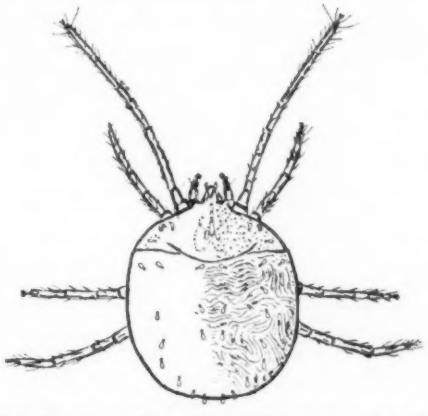

Figure 12-A. The clover mite invades dwellings in the cool moist weather during spring and autumn. It does not damage household goods directly, but when crushed it leaves a stain which is difficult to remove. Note the unusually long legs which extend forward for a distance equal to the length of the body. (Courtesy of Baker and the National Pest Control Association.)

A number of toxicants are quite effective for clover mite control, but these must be applied to a band of lawn area 20 feet wide around the house as well as to the foundation and outside walls of the building. Suitable toxicants include malathion as a 1% emulsion or at the rate of 32 pounds of 25% wettable powder per 100 gallons of water, Chlorobenzilate at the rate of 0.05% emulsion or at 1.5 pounds of 25% wettable powder per 100 gallons of water, or Kelthane at the rate of 0.05% emulsion. These materials should be applied at the rate of 15 to 20 gallons of finished spray

*Correspondence Course Editorial Committee: Dr. John V. Osmun, Dr. Howard O. Deay, William L. Butts, Dr. Philip J. Spear, Dr. Harry D. Pratt, George L. Hockenyos, and James A. Nelson.

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per 1,000 square feet of lawn area. The operator must be careful not to overdose with emulsions since burning of the vegetation might result.

SCORPIONS

Class Arachnida : Order Scorpionida

Scorpions are quite common in all of the southern states. Most of those that enter houses are not very poisonous, their stings being comparable to those of bees or wasps. Most scorpions are active at night. During the day they hide under bark, boards, in rubbish, and in houses, closets, shoes or folded clothing.

Typical of the scorpions is the common striped scorpion, *Centruroides vittatus* (Say) which is widely distributed in the southern states. It has 2 broad, dark bands extending the length of the back. The remainder of the body is yellowish-brown. Mature specimens are slightly less than 1½ inches long.

Two dangerously poisonous scorpions are *Centruroides gertschi* Stahnke and *Centruroides sculpturatus* Ewing. They may reach a maximum length of 2 to 3 inches. Both species are found in southern Arizona and adjacent areas of California, New Mexico, and Texas. Scorpions are found in homes in these areas because of the availability of water in and around the house.

The first thing to do to control scorpions around dwellings is to remove all debris such as loose boards, rocks, stacked wood or any other materials under which they can hide. The entire area should then be sprayed with emulsions or oil solutions of 2% chlordane or 0.5% dieldrin, or dusted with 5% chlordane or 1% dieldrin. These insecticides should be applied heavily and thoroughly to such areas as crevices in woodwork, closets, around plumbing, woodpiles, outside doorways and windows, and to the ground around plants outside the house.

CENTIPEDES : Class Chilopoda

Centipedes, other than the house centipede which is included under miscellaneous pests, usually live outdoors in damp areas such as under leaves, stones, boards, tree bark, or in mulch around outdoor plantings. They wander inside houses where they may be found almost anywhere. If accidentally injured, they may bite, causing some pain as well as a slight swelling.

The bite is usually not serious; however, an antiseptic should be used on the wound and a physician should be consulted in all cases of centipede bites.

Emulsions or wettable powders of 2% chlordane, 1% lindane, or 2 to 5% malathion should be applied heavily to the ground around the house.

MILLIPEDES, Class Diplopoda

Millipedes normally live outdoors in damp places such as under leaves and in mulch around outdoor plantings. They feed on damp and decaying vegetable matter as well as new roots and green leaves. At times, they move in great numbers into buildings and become a temporary pest.

Where millipedes are present in annoying numbers, damp organic matter such as plant mulch or decaying leaves, should be removed from the vicinity. Sprays of 2% chlordane emulsion, or dusts of 5% chlordane, or 2 to 5% malathion should then be applied thoroughly to all areas where the millipedes have been found.

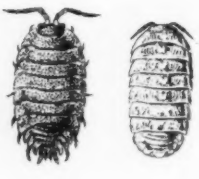

Figure 12-B.
The sowbug (left) and the pillbug (right) are pests which occur frequently in damp situations indoors. Note the two projecting appendages at the tip of the abdomen of the sowbug. No such projections occur on the pillbug. (From *Monograph on the Isopoda of North America*, by Richardson.)

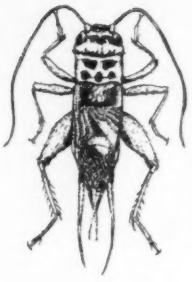

Figure 12-C.
The house cricket is a widely distributed pest which may occasionally damage stored clothing in addition to being an annoyance because of its presence alone. The field crickets have the same general body shape, but are much darker in color. The small field crickets of the genus *Nemobius* are considerably smaller than the house cricket. (Drawn by J. Wolerstein.)

PILLBUGS and SOWBUGS

Class Crustacea : Order Isopoda

These pests are crustaceans and are more closely related to shrimps and crayfish than to insects. The dooryard sowbugs, *Porcellio leavis* Koch and *Porcellio scaber* (Latrielle) possess 2 tail-like appendages at the tip of the abdomen and are incapable of rolling into a tight ball. The common pillbug, *Armadillidium vulgare* (Latrielle), lacks such appendages and can roll itself into a ball. (See Figure 12-B.)

Both pillbugs and sowbugs feed upon decaying vegetable matter and are found under vegetable debris of all kinds and beneath objects on damp ground. They frequently invade damp basements and crawl spaces and may infest potted plants. A heavy infestation indoors generally indicates that there is a large population immediately outside the building.

Control measures must be carried on both inside and outside. Emulsions of 2% chlordane are effective inside. Outside, dusts of 5% DDT or 3% benzene hexachloride should be applied in a band 2 to 5 feet wide around the foundation of the building.

SLUGS and SNAILS

Phylum Mollusca : Class Gastropoda

These animals belong to the phylum Mollusca and are closely related to clams and oysters. At times, they gather in large numbers in damp basements or crawl spaces, leaving glistening mucous trails as they move about under the cover of darkness.

These pests can be controlled with baits containing metaldehyde or with thorough applications of heavy dosages of dust or wettable powder formulations of residual insecticides. Sodium flouride is effective, but it is extremely toxic, and care must be exercized when this material is used. Baits should be placed in such a way as to be unavailable to children and pets.

CRICKETS

Order Orthoptera : Family Gryllidae

The house cricket and the field cricket commonly invade homes. When present in large numbers, they are a considerable annoyance and can cause damage to some fabrics.

Crickets have a gradual metamorphosis. The young look like adults excepting that the wings and genitalia have not developed fully.

The house cricket, *Acheta domestica* (Linnaeus), lives outdoors but may invade houses in great numbers. Adults are 18 to 20 millimeters long with 3 dark bands

on the head and long thin antennae. The body is light yellowish-brown. See Figure 12-C. This cricket is nocturnal in habit, usually remaining hidden during the day. They are omnivorous, eating or drinking almost anything that is available. In households, they may eat silk, woolens, paper, fruits, and vegetables.

The field cricket *Acheta assimilis* F., is widely distributed over the United States. It is larger than the house cricket with its wings extending back beyond the wing covers. They frequently invade houses and feed on a wide variety of materials. Smaller field crickets of the genus *Nemobius* may also invade homes in late summer.

Satisfactory control of crickets frequently involves treatment both inside and outside the house. Pyrethrum sprays will kill those crickets which are contacted directly by it. Any of the common residual insecticides can be used to spray thoroughly behind furniture, in closets, around fireplaces, and under baseboards. Dusts can also be used satisfactorily in any of these places.

Outside, 5% chlordane dust, 0.5% lindane emulsion, 1% DDT wettable powders, or organic phosphate insecticides such as malathion or Diazinon can be used effectively. All surfaces such as shrubbery and the ground itself should be treated thoroughly.

EARWIGS, Order Dermaptera

Earwigs are serious household pests in many parts of the United States. The prominent pair of forceps at the tip of the abdomen easily distinguishes them from most other insects. See Figure 2-N. They are omnivorous, but generally prefer plant materials.

They live under rocks and litter of all kinds. Inside, they seek cracks and crevices or the folds in clothing. Where present, they frequently invade homes in great numbers.

Although they can be killed inside a house with almost any of the commonly used insecticides, control of earwigs is usually an area problem rather than one of the individual household. When they are killed only inside the house, others will quickly move in from outside.

Baits containing wheat bran, sodium fluosilicate, and fish oil can be scattered in infested areas to give good control. This method is dangerous where children or pets are present since the sodium fluosilicate is poisonous.

10% DDT, 5% chlordane, 1% benzene hexachloride, or 1% dieldrin used as dusts or wettable powders have been used effectively in earwig control. Ground areas to be treated should be thoroughly covered with heavy doses of chemical. This treatment may need to be repeated 1 or 2 times at about 10-day intervals.

Considerable difficulty has been experienced in the southern part of the United States with regard to earwig infestations. It is not known at this time which species are involved or how many species are related to the problem. The materials normally used for control in the past seem to be inadequate in some of these situations. Good results have been obtained using methyl trithion at the rate of 1 pound of actual per 5000 square feet. When this treatment is made, children and pets must be kept off the treated surface for at least 24 hours. Treatment of entire lawns must be made, and it is desirable to treat a number of lawns in an area whenever possible. If the residents can be made to understand that the best means of control is that done on a large area basis, the results will be more satisfactory to all concerned.

CHINCH BUGS, *Blissus* spp., Order Hemiptera : Family Lygaeidae

These insects are important as occasional invaders throughout most of the southern part of the United States. They develop outdoors, feeding on the grass in lawns and often entering houses in great numbers. The most important of the chinch bugs which are commonly found in lawns is *Blissus leucopterous hirtus* (Montandon), the hairy chinch bug. This is a small black and white bug, the wings of which extend only about half the length of the abdomen when at rest. See Figure 12-D.

Figure 12-D.
The hairy chinch bug is a serious pest of turf in many parts of the country, particularly in the southern states. It migrates indoors in great numbers, causing considerable annoyance.

Control of these bugs cannot generally be accomplished without a thorough treatment of the lawn. A number of materials have been used for such treatments, but at the present time the most effective means of control is the application of methyl trithion at the rate of 1 pound of actual per 5000 square feet. Children and pets must be kept off the treated surface for at least 24 hours. Do not use methyl trithion indoors. Indoor treatments with 0.5% dieldrin or 5% DDT are effective. Make applications to window frames, door frames and other points of entry.

BOXELDER BUG, *Leptocoris trivittatus* (Say) Order Hemiptera : Family Corizidae

The boxelder bug is a common pest over much of the United States. Adults are about ½ inch long. They are bright red or black in color with narrow reddish lines on the back. See Figure 12-E.

Figure 12-E.
The boxelder bug, a common pest which invades homes in the autumn. The adult shown here is black with red markings. The nymphs are bright red.

These insects feed principally by sucking juices from the boxelder tree but are also sometimes found on other plants.

Usually, when they invade a home they are pests only by their presence, although they can bite on occasion causing a slight irritation.

Control is best accomplished by spraying infested trees during the early summer months when the bugs are immature. The pest control operator is not usually called, however, until the adult bugs invade a home. At this time, they frequently gather in masses along foundation walls, along fence rows, and at the bases of trees, as well as inside the house.

Outside, they can be controlled by thoroughly wetting the visible bugs and the surfaces over which

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Reference to Figures preceded by the number 2, will be found in Lesson 2 of this course.

they crawl with 5% DDT emulsion or 1% dieldrin emulsion. Several gallons of the spray material should be used so as to wet the treated area thoroughly.

Inside the house, control can be accomplished by the use of pyrethrum contact sprays. The treated rooms should be filled with the spray mist and then kept closed for several hours. Sabadilla powder can be used with good results. Residual applications of 5% DDT can be made to such places as window frames, door frames, and any place at which a crack or other opening may give the bugs access to wall voids. DDT is effective but kills rather slowly. Whenever possible, DDT should be considered for use against the boxelder bug and other pests which hibernate within homes because of its peculiar property of being somewhat more toxic at lower temperatures than are other insecticides. This increase in toxicity with decreasing temperature is often referred to in the literature as a "negative temperature coefficient" of insecticidal activity.

Figure 12-F.
The hackberry psyllid. The immature stages of this insect form galls on the leaves of hackberry trees. The adults enter buildings in the autumn. The psyllids are very small and can easily pass through ordinary window screens. (From Herrick, *Insect Enemies of Shade Trees*. Courtesy of Comstock Publishing Co.)

HACKBERRY PSYLLIDS
Order Homoptera : Family Psyllidae

Hackberry gall psyllids of several species are common in the midwestern states. Nymphs infest hackberry trees in the spring and summer and adults in large numbers frequently invade homes in the fall.

Control is best done on the nymphs while they are developing on the trees. Sprays of 2 pounds of 12% benzene hexachloride or 1 pound of 25% lindane wettable powder per 100 gallons of water are effective if applied to the trees just before the leaves are fully expanded.

A pest control operator is most frequently called, however, to control the adults which are invading homes. These small insects are tiny enough to enter a house through an ordinary fly screen. See Figure 12-F. 1% lindane, 2% chlordane, or 5% DDT applied to screens, window and door frames will help to prevent their entering a house. Inside, aerosols or sprays of pyrethrum will kill those contacted directly with the insecticide.

THRIPS, Order Thysanoptera

These very small, slender insects are important pests of many crops. The adults and larvae of the onion thrips, *Thrips tabaci* Lind., and the grass thrips, *Anaphothrips obscurus* (Mull.), frequently invade homes where they may cause an itching bite or be a pest because of their presence alone. The grass thrips is sometimes also called the "oats bug." See Figure 2-D. Control measures listed for hackberry psyllids are recommended.

ELM LEAF BEETLE, *Galerucella xanthomelaena* (Schrank)
Order Coleoptera: Family Chrysomelidae

This pest of elm trees frequently occurs in great enough numbers to be a problem in homes. Adult beetles are yellowish to dull green in color with a

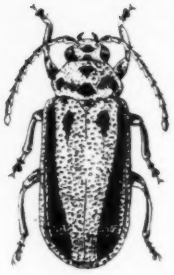

Figure 12-G.
The elm leaf beetle adult is a common autumn invader, particularly in residential areas. They are yellowish when they emerge, but the body often darkens to an olive green with age. (Drawn by J. Wolerstein.)

black stripe down each side of each forewing (elytron). They are about ¼ inch long. Larvae are yellowish, spotted and striped with black. See Figure 12-G.

Adults enter the home either in the spring or late summer and are difficult to control. Pyrethrum sprays applied directly to the adults will kill them inside the house. Chlordane, lindane, or dieldrin dusts applied around the foundations outside will kill many of the beetles and prevent their entering the home.

Control is best accomplished by spraying the trees on which the larvae and adults are living. Sprays for this purpose are 6 pounds of lead arsenate or 2 pounds of wettable DDT per 100 gallons of water.

Limited control can be obtained by spraying directly with a pyrethrum contact insecticide. Use residual sprays on screens and window sills.

ROOT WEEVILS, *Brachyrhinus* spp.
Order Coleoptera : Family Curculionidae

There are several species of weevils of the genus *Brachyrhinus* whose feeding stages attack various wild and cultivated plants. The adult weevils enter homes in late summer and early fall, causing considerable annoyance. The beak which bears the mandibles at its tip is a characteristic common to all weevils, but in this genus it is shorter than usual. These pests do no actual damage but are annoying to the home owner. The strawberry root weevil, *Brachyrhinus ovatus* (Linnaeus), is one of the more common pests of this genus. It is a stoutly built black beetle about ¼ inch long. (See Figure 12-H). The black vine weevil, *Brachyrhinus sulcatus* (Fabricius) differs in being slightly larger and in having small patches of golden hairs on the front wings.

The adult weevils cannot fly, and treatment of doorsills, window frames and the top of the foundation with 5% DDT is an effective means of control for those which crawl in. Since the larvae feed on plant roots, a general lawn treatment should be carried out, applying heptachlor, dieldrin or aldrin to the soil at the rate of 3 to 5 pounds of actual toxicant per acre.

GROUND BEETLES
Order Coleoptera : Family Carabidae

Various ground beetles of the family Carabidae wander into homes from time to time. These beetles vary greatly in size, shape and color. Most of them are dark, shiny and somewhat flattened although some species are brilliantly colored. Ground beetles live on

Figure 12-H.
The strawberry root weevil is a common insect which becomes a pest in late summer and autumn by entering buildings prior to hibernation. Several other species of the same genus have similar habits. They do no harm to man nor to household furnishings.

the ground under leaves, logs, stones and other debris. They feed mostly at night. Only a few species fly or are attracted to lights. These pests usually gain entrance to houses by crawling in through small openings or through open doorways.

Control consists of eliminating outdoor hiding places, whenever possible, and treatment of outdoor areas with insecticide. Firewood should be piled as far away from the house as practical, and in wooded areas, debris should be cleared up around the perimeter of the house.

Chemical treatment can be made with emulsions or wettable powders of 5% DDT, 2% chlordane, or 1% dieldrin. Ground areas around the building should be treated heavily for a distance of 20 to 50 feet from the building.

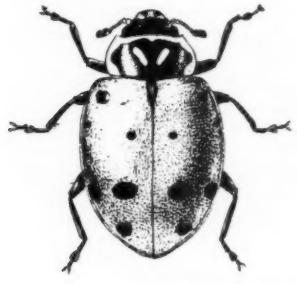

Figure 12-I.
A lady beetle. A number of species of lady beetles occasionally cause annoyance by entering buildings during the autumn. The beetles are usually brightly colored with stripes or spots of contrasting colors. (Courtesy U. S. Department of Agriculture.)

LADY BEETLES
Order Coleoptera : Family Coccinellidae

Although they are among our most beneficial insects, adult lady beetles may cause considerable annoyance by congregating inside buildings to hibernate. (See Figure 12-I).

Since the beetles generally congregate within a quite limited area, a thorough spraying of the points of infestation with 5% DDT or 2% chlordane will usually give the desired results.

LIGHT-ATTRACTED PESTS

Pest control operators are often called on to control a wide variety of insects which are attracted to lights at night. Drive-in restaurants and theatres, golf driving ranges, dairies, paper manufacturers, outdoor swimming pools, and people who use their patios at night are particularly bothered. Various leafhoppers (order Homoptera), moths (order Lepidoptera), stone-flies (order Plecoptera), May-flies (order Ephemeroptera), some members of the order Neuroptera (alderflies, dobsonflies, lacewings), and beetles (order Coleoptera) are the insects most frequently attracted to lights.

Because most of the insects found around lights can fly for a considerable distance, those killed are usually quickly replaced by new arrivals. Space sprays, such as pyrethrum, can be used to kill the insects which are present at any given time but must be used over and over again as new insects fly in. Where the rate of fly-in is not too great, residual insecticides such as 5% DDT or 2% chlordane will give some degree of control if they are applied to all available surfaces in the affected area.

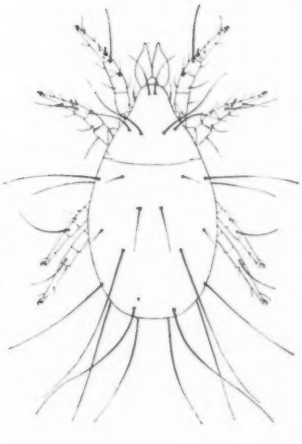

Figure 12-J.
The mushroom mite occurs frequently in stored foods in the home. High humidity is quite conducive to its development, and very large populations can be built up in short periods of time. (Courtesy of Baker and the National Pest Control Association.)

MISCELLANEOUS PESTS

MITES of PROCESSED FOODS, Order Acarina

Two mites which are often found infesting processed food products are the mushroom mite, *Tyrophagus lintneri* (Osborn) and the grain mite, *Acarus siro* Linnaeus. The former is a serious pest of mushrooms and also attacks cheese, grain, cereal products, and occasionally attacks dried meats. The latter will attack any grain or cereal product with a moisture content in excess of 12% (See Figure 12-J).

Control of these mites in commercial food storage areas is often very difficult or impossible except by fumigation with methyl bromide; areas around infested packaged foods can be sprayed with 5% DDT or 2% chlordane. While such treatment may not give the desired control, it will contain the infestation. Reports vary widely with regard to the effectiveness of various toxicants, but treatment by direct contact sprays containing synergized pyrethrins is practically always satisfactory. Many of the problems of infestation by these mites can be remedied or prevented if the moisture content of the food products can be maintained at less than 12%. (See Figure 12-J)

HOUSE CENTIPEDE, *Scutigera coleoptrata* (Linnaeus)
Class Chilopoda

The house centipede is a common pest in many parts of the country which, unlike most other centipedes, can live during its entire life inside a building.

The body of this centipede is usually only an inch or slightly more long but its 15 pairs of very long legs make it seem much larger. The body is grayish-yellow with 3 dark stripes extending the full length of the back. The legs are quite long in proportion to the size of the body and have alternate light and dark bands running around them.

In homes, the house centipede lives in damp areas such as cellars, closets, bathrooms, and unexcavated areas under the house. Its eggs are laid in these same damp places, as well as behind baseboards and beneath bark of firewood. Adults are usually discovered when they run rapidly across the floor of the house. They are often accidentally trapped in bathtubs, sinks, and lavatories.

Although this centipede can bite, its jaws are quite weak and usually there is no more than a slight swelling as a result.

The house centipede feeds on small insects and their larvae, and on spiders. From an entomological point of view, they are thus beneficial. The housewife, however, usually takes a different point of view and insists that they be eliminated.

Control is a relatively simple operation. Emulsions or oil solutions of 1% lindane, 2 to 5% malathion, or 2% chlordane should be applied to all of the usual hiding places such as crawl spaces, dark corners in basements, and behind baseboards. Pyrethrum powder is also good.

SPIDERS

Class Arachnida : Order Araneae

Many species of spiders are common household pests in the United States. The common household spiders spin webs over lamps, in corners, and in basements thus creating an unsightly situation but causing no real harm. Remember that every "cobweb" was made by a spider. Although all spiders have poison with which to kill their prey, the black widow and the brown recluse spider are the only North American species consistently dangerous to man. All spiders do inject venom when they bite and although there is generally little danger of complications, it is wise to advise all victims to consult their physicians.

The black widow, *Latrodectus mactans* (Fabricius), is widely distributed over the warmer portions of the United States. Females are easily identified, having a globular, shiny black abdomen with two reddish or yellowish triangles on the underside which form a characteristic hourglass marking. See Figure 12-K. The abdomen is about ¼ inch in diameter but may be as large as ½ inch when the female is full of eggs. The male is much smaller and lighter colored with light streaks on the abdomen.

The web of the black widow is an irregular mass of fibers with a small central area to which the spider retires to wait until its prey becomes ensnared. These webs are frequently constructed underneath boards, stones, or the seats of outdoor privies.

Areas where they have been found should then be sprayed with oil sprays or emulsions of 1% lindane or 2% chlordane paying particular attention to the treatment of dark corners. Remember that the spider must be contacted by the spray for it to be effective. Dusts of lindane or chlordane will give good control when applied directly to spider webs.

The brown recluse spider, *Loxosceles reclusa* Gertsch, can also be a very dangerous biter. The initial pain associated with the bite is not intense, and it is generally less troublesome than a bee sting. Within 8 to 12 hours the pain becomes quite intense, and over a period of a few days a large ulcerous sore forms. This sore heals very slowly and leaves a large, ugly disfiguring scar.

This spider has become a rather serious pest in Kansas and Missouri and is probably fairly well distributed in the southwestern United States.

The control methods recommended for the black widow are also effective against the brown recluse.

Many other spiders are found in houses. None of them are particularly harmful, although they are a nuisance to the housewife. In basements and crawl spaces, they can usually be controlled effectively by a thorough spraying or dusting with any of the common insecticides.

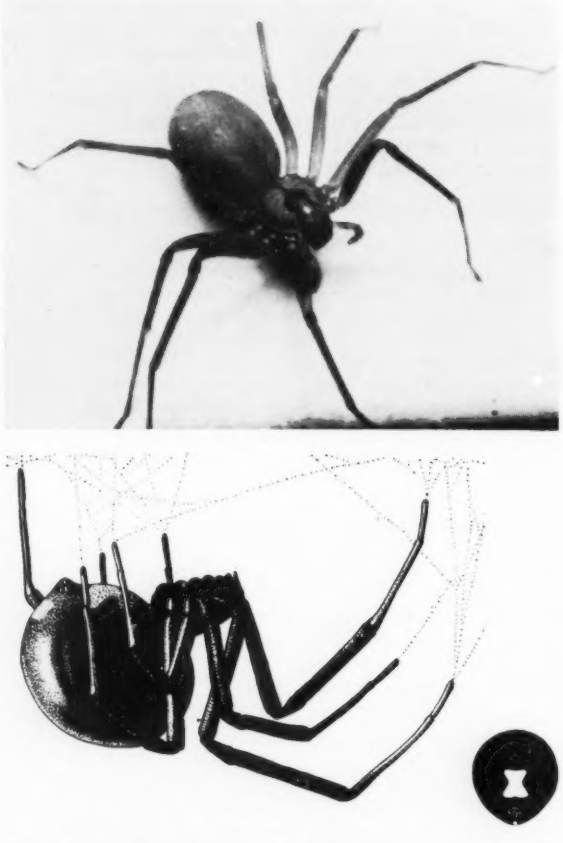

Figure 12-K. Two dangerous spiders found in the United States. The brown recluse (upper photo) can be identified by the distinctive violin-shaped mark on the upper side of the cephalothorax. The lower drawing shows the black widow in the position assumed when in the web. The insect at the lower right shows the typical hourglass marking which appears on the underside of the abdomen of this spider. (Upper photo courtesy of Wingo and Kyd. Lower drawings from *How to Know the Spiders* by Katson and Katson. Courtesy of H. E. Jacques.)

SILVERFISH and FIREBRATS

Order Thysanura : Family Lepismatidae

These insects of the order Thysanura all have the same characteristic shape. Their bodies are flattened, long and slender, and broad at the front tapering gradually toward the rear. The antennae are long and slender. Three long, slender appendages are found at the rear of the body giving rise to a common name, "the bristle tails." All silverfish are wingless. The young look like small adults, and the development is without metamorphosis.

Silverfish may be found almost anywhere in a house. Usually they will be found living close to their source of food.

They eat a wide variety of foods containing proteins or carbohydrates. Such things as rolled oats, dried beef, flour, starch, paper, cotton, some synthetic fibers, sugar, beef extract, glue, paste, and linen are all normal items of diet. Silverfish can live for long periods of time without food.

The silverfish, *Lepisma saccharina* Linnaeus, is found in all parts of the United States as well as over much of the rest of the world. The body of an adult is about ½ inch long, with a uniform silvery color all over the back. See Figure 12-L. It prefers temperatures of 70°F. to 80°F. and moist situations. Eggs are laid in protected situations, such as behind baseboards, and hatch in from 20 to 40 days depending on temperature and humidity.

The four-lined silverfish, *Ctenolepisma quadriseriata* (Packard), attains a maximum body length of ⅝ inch. The back is marked with 4 dark lines extending the length of the body. See Figure 12-L.

This species may live either inside or outside a building and this must be taken into account when controlling them. They may live in extremely dry situations as well as in more moist ones.

Ctenolepisma longicaudata Esch. is the largest of our silverfish, reaching a maximum body size of ¾ inch. It is a silvery or gun-metal color on the back. This silverfish is common in California and New England.

The firebrat, *Thermobia domestica* (Packard),

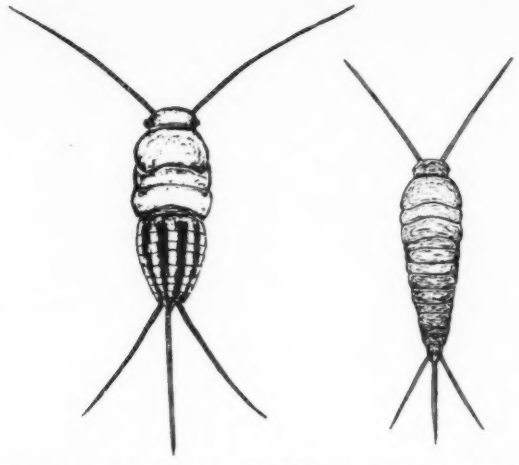

Figure 12-L. The four-lined silverfish (left) and the silverfish (right) are often found infesting buildings. Two other related species, the firebrat and *Ctenolepisma longicaudata* Esch., are also found in buildings. They have the same general body shape as does the four-lined silverfish, but they differ in coloration. The firebrat has numerous patches of dark scales intermixed with white scales, giving it a somewhat mottled appearance. *C. longicaudata* is a rather uniform gray and has no distinctive contrasting markings. (Legs not shown in above drawings.)

lives under unusual conditions and in general will be found in areas not frequented by silverfish. It prefers temperatures in excess of 90°F. and is frequently found around ovens, in bakeries, and in boiler rooms.

The bodies of adults are about ½ inch long and marked on the back with numerous dark patches which give it a mottled grayish appearance. See Figure 12-L.

Eggs are laid in crevices and hatch in about 12 days under good conditions.

Oil sprays or emulsions of 5% DDT, 1% lindane, 2% chlordane, 3% malathion, or 0.5% Diazinon give good control. Some pest control operators add a contact spray, such as pyrethrins or organic thiocyanates, to their residual sprays to obtain a faster knockdown and kill.

Sprays should be applied thoroughly to all possible hiding places such as cracks and crevices in basements, cupboards, clothes closets, behind baseboards, wooden partitions, and around steam and water pipes. In the case of the four-lined silverfish, it may also be necessary to treat the plant mulch around the outside of the building; in this case a formulation other than an oil base spray must be used.

DDT and chlordane dusts will give effective control of silverfish when applied thoroughly to the cracks and crevices where the insects live. Baits are still useful.

SPRINGTAILS, Order Collembola

These insects, commonly called springtails, are frequently found in houses although they occur more commonly outdoors. They are very small, usually less than 2 millimeters long. The body may be whitish or grayish and does not have wings. In most species, there is a forked appendage attached to the back of the underside of the abdomen. This appendage can be moved away from the body suddenly thus causing the insect to jump. From this, they get the common name of springtails. See Figure 2-F.

They feed on algae, fungi and decaying vegetable matter.

They are usually found in damp places such as cork insulation, kitchens, bathrooms, around drains, in moist basements, on damp walls, the soil of potted plants, in stored plant bulbs, and especially around window jambs. Most springtails do not damage anything and are pests only by being present in great numbers.

Emulsions of 1% lindane or 2% chlordane should be applied to moist surfaces where Collembola occur indoors. Outdoors 5% chlordane or 2% dieldrin dusts or wettable powders should be applied thoroughly to the areas where the insects are found.

Since Collembola are generally restricted to rather humid habitats, the best means of obtaining control is to either advise or institute measures which will lower the humidity. In many cases a matter of simple airing of the room will be sufficient. The use of a fan to keep the air moving through the infested area may have the necessary drying effect. It is wise to clean up any loose boards or similar materials from damp floors. In short, any procedure which can be carried out so that moist places of concealment are eliminated will very likely be of value in controlling springtails.

PSOCIDS, Order Psocoptera

Psocids, or booklice, are common household pests throughout the United States. Although there are more than 100 species occurring here, only a few are common pests in homes. The two most commonly found are the common booklouse, *Liposcelis divinatorius* (Mull.), Family Liposcelidae; and the deathwatch, *Trogium pulsatorium* (L.), Family Trogiidae. Both of these species are found in all states. See Figure 12-M.

These insects are quite small, attaining a maximum size of 1 to 2 millimeters. They can be separated from each other by the fact that the booklouse is wingless while the deathwatch has very small scale-like wings.

Both of these species have similar habits. They may be found either outdoors or indoors. Outdoors, they live in damp places such as under bark, in grass, leaves, and on damp wood. Indoors, they find similar situations in stored foods, crawl spaces under houses, in insect collections, and around books. Some other species are found infesting bagged feed in warehouses. Their food consists of microscopic molds and fungi, hence they prefer damp, warm, undisturbed situations where these are to be found. They cause no destruction and are pests only by being present. Frequently, they

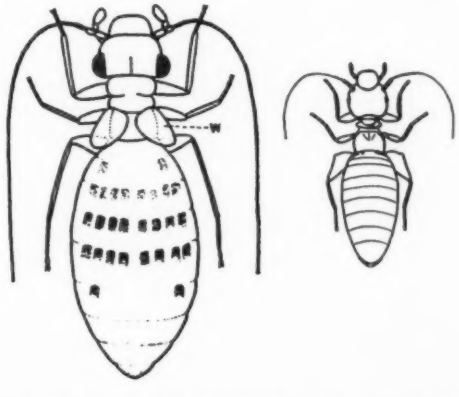

Figure 12-M. The deathwatch (left) and the booklouse (right) are two members of the order Psocoptera which commonly occur indoors. Note the small, scale-like wings and large eyes of the deathwatch. These characteristics set it apart from the booklouse which has no wings and very small eyes. (From *Handbook of Pest Control* by Arnold Mallis. By permission of MacNair-Dorland Co., New York.)

are found in great numbers and crawl over everything in the areas where they occur. They are often found in feed concentrates that contain antibiotics of fungal origin. Control can be obtained with the same materials and methods listed for springtail control.

DERMESTIDS, *Dermestes* spp.
Order Coleoptera : Family Dermestidae

Several species of the genus *Dermestes* often cause considerable difficulty in homes and in various industrial establishments.

The larder beetle, *Dermestes lardarius* Linnaeus, is a common pest of hides and stored foods, particularly in products with a high protein content. Adult beetles are dark brown with a pale yellowish band across the front half of the wing covers. There are 6 darker spots on this yellow band. The body is 7 to 9 millimeters long. The larvae are 11 to 13 millimeters long with 2 curved spines on the upper side of the last visible body segment. The body is irregularly clothed with long hairs. Damage is caused by both larval and adult stages.

The first step in larder beetle control is to locate and dispose of the infested materials. All food products should be removed from the immediate area and a thorough application of 5% DDT, 1% lindane, 2% chlordane, or 0.5% dieldrin should be made.

When the infestation occurs in a cupboard or storage closet, all food materials should be removed so that all the shelves can be treated with residual materials. When the deposit is completely dry, the surfaces should be covered with shelf paper and the food reshelved.

The incinerator beetle, *Dermestes ater* (DeGeer), infests the same type of materials as does the larder beetle. The adults are black with a scattering of yellow hairs on the body. The larvae are similar to those of the larder beetle. They can be eliminated from incinerators by removing unburned organic materials followed by an application of residuals as listed for larder beetle control.

The hide or leather beetle, Dermestes maculatus (DeGeer), is similar in general appearance to the incinerator beetle. The wing covers each taper to a fine point at the inner margin of the tip. Larvae are similar to those of the other species of *Dermestes*, and they have a strong tendency to burrow into wood and other building materials. The pupal stage is passed in these tunnels which are sometimes so numerous as to weaken the building structurally. Materials used for larder beetle control are effective against this pest.

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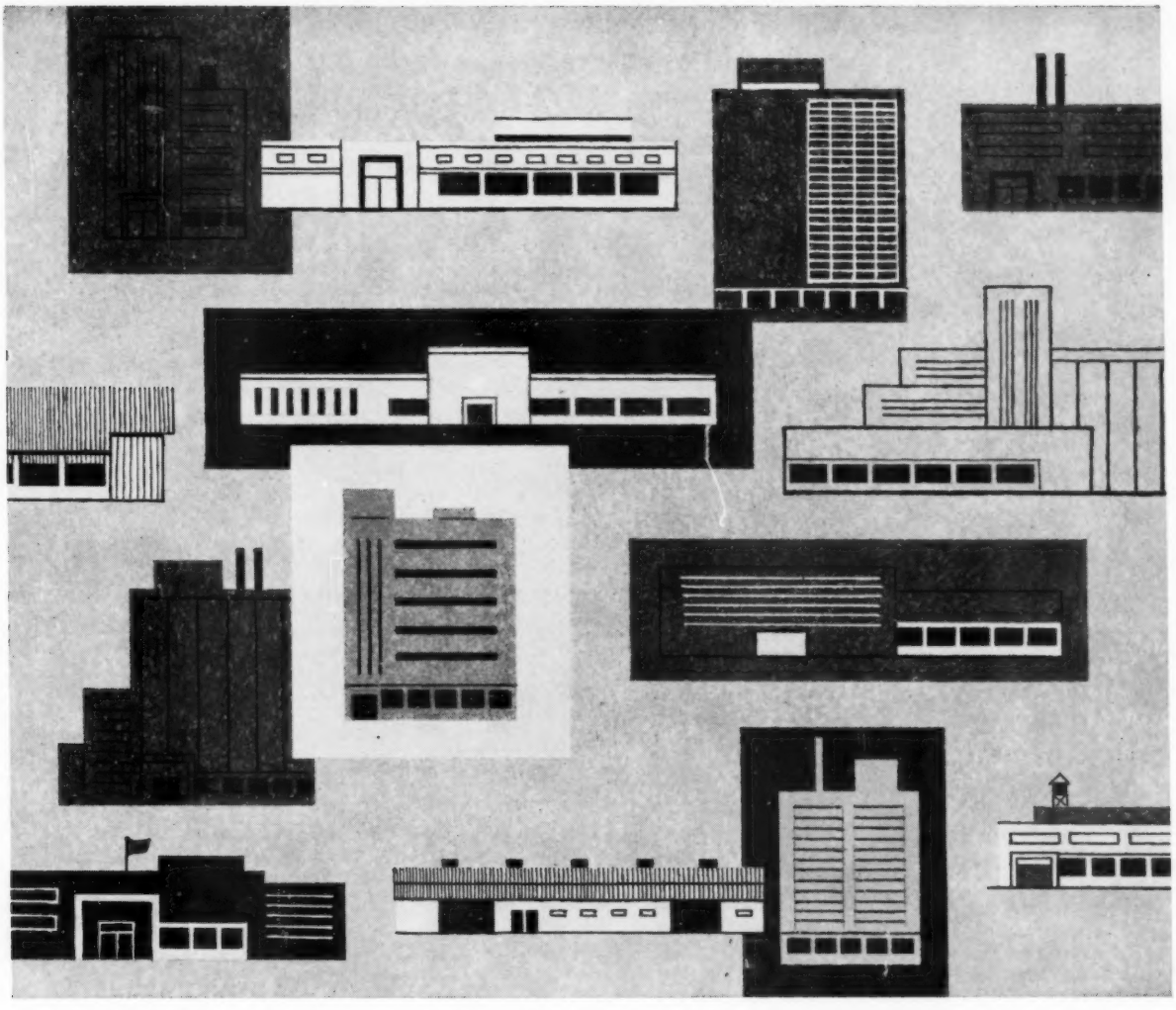
Next Month: Subterranean Termites



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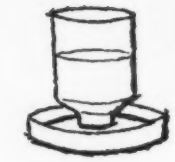

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MOTOMCO, INC.
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PCOs Will Up Sales in '62

(*from page 18*)

next 12 months. It is doubly important because there is nothing in the offing to halt the upward movement in average hourly wages. This is the almost universal opinion of the economists surveyed by the Dodge Corporation. So PCOs may end up singing, "A good man, at the right price, is hard to find."

Need Government, Capital Spending

Continued government spending and industry outlays for capital equipment are the bedrock on which these forecasted pinnacles are resting. PCOs have indicated they are going to buy their share of new equipment, and the government is not being exactly tightfisted. A major midwestern manufacturer of heavy production machinery and tools reports a rise in orders, and a spokesman for DuPont sees a 10% increase in production. Everything points upward, and barring an international crisis, the optimism so rosily put forth by PCOs seems justified.

Wholesale Prices Up, Credit Tight

There are several things to watch out for, the most obvious being inflation. And some of the many PCOs who are going to expand next year may have money problems; credit will tighten slowly. This is the opinion of *U. S. News and World Report*, which also amiably predicts a sharp upturn in profits and an alltime record high in the GNP. As the year progresses, though, the magazine warns, the rate of rise will slow down. All industries will share in the increase while it lasts, the periodical says.

PCOs may have to pay more, too, for the materials they use to do their jobs. Practically all the experts polled by the Dodge Corporation feel wholesale prices will creep upward in 1962. Foreign competition and ample production capacity in industry may keep this rise to a minimum.

New markets, new methods, new men — PCOs will be working with them all in 1962. Glowing forecasts of expansion mean, if the international situation does not erupt into violence, 1962 will be the best year PCOs have ever chalked up.

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Case Histories Show Most Callbacks Can Be Avoided When Servicemen Are Properly Trained

MISTAKES ARE COSTLY!

by PAUL M. ESTES

1961 Graduate, Purdue Course in Structural Pest Control
Recipient of *Pest Control* Magazine Scholarship.

COULD MOST CALLBACKS be avoided if servicemen had the technical know-how and experience their supervisors have labored so long to get? Does the crux of serviceman training lie in the actual application of knowledge, accenting the "how" and "why" rather than "what"?

Recent investigations indicate the answer is "yes" to both questions. While it is obvious servicemen must be well trained to perform neat, safe, effective jobs, special incidents arise in day-to-day service work that require resourcefulness and thorough knowledge of specific pest control technology. Servicemen who fail to fully understand control problems can adversely affect their company's entire operation. In more fortunate cases, confusion may be limited to small, one-time-only treatments.

In the final analysis, servicemen must carry out company policies and abilities; if they fail, customers are lost, and the company ends up in the red.

Maggots or Beetles?

In one case, for example, a leading midwestern PCO received a call from an obviously distraught housewife who was upset about maggots crawling in her carport, near where she stored garbage. Attempting to calm her, the PCO said his serviceman would come over promptly to eradicate her unwelcome visitors. When the serviceman arrived, he treated for fly maggots in a routine manner and, in accordance with company policy, guaranteed control of the pests. Early next day, another call from the now indignant homemaker interrupted the PCO as he was going over his morning mail. Flatly and crisply, the customer disclosed her new problem: "Those maggots are eating leaves off my shade trees," she protested. Surprised, the PCO sent his most experienced man to investigate. An astute serviceman, he saw at once that the "maggots" were leaf beetles in their larval stage. Since control was initially guaranteed, treatment of trees around the house was performed at no charge. The company lost money, plus the goodwill of a valuable customer, now displeased and distrustful. All could have been avoided had proper identification been made in the first place.

Recognize Insects Promptly

Mistaken identity has accounted for many blunders, and early recognition cannot be overemphasized. In Texas recently, a PCO was called on to get rid of a roach infestation in a prominent citizen's suburban home. After treatment, the homeowner's wife telephoned to say her roaches were still active. The PCO hurriedly dispatched a serviceman to re-treat the home, while assuring his customer this second treatment would be successful. When the serviceman arrived, he realized the insects were not roaches, and at a loss to identify them, he sprayed the kitchen with a residual insecticide. Next day the woman's husband stopped by during lunch to complain personally that the treatments were getting nowhere; roaches were crawling all over his kitchen and pantry that morning, he said. This time a supervisor rushed to the home and immediately recognized an infestation of cowpea weevils, which are often found in dried beans. A search of pantry shelves revealed several bags of heavily infested, dried, black-eyed peas. Ordering treatment for weevils, the supervisor removed the peas, and thereafter no insects were reported.

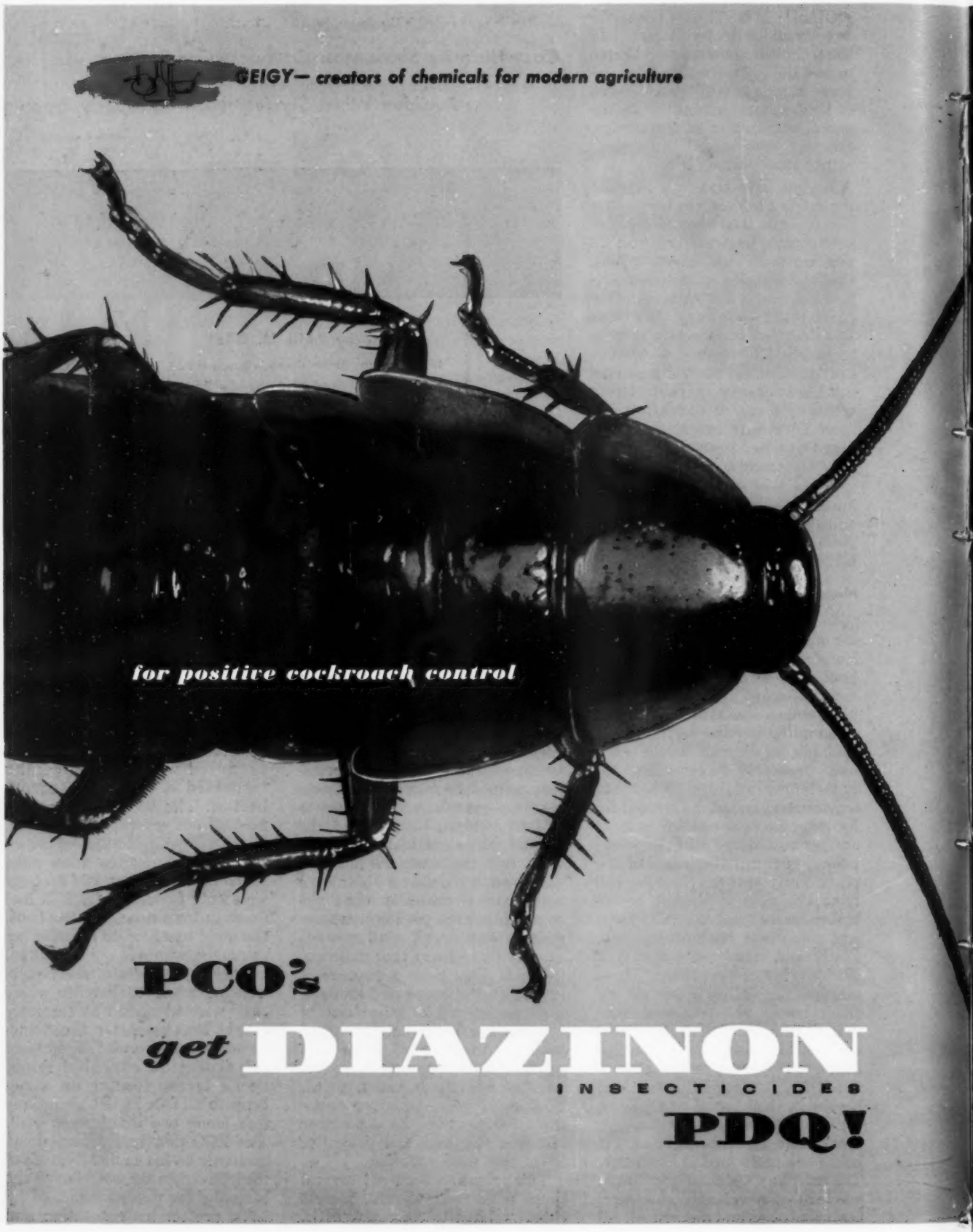
This situation occurred several times with bean weevils, insects closely related to cowpea weevils. They scarcely resemble cockroaches! Reason these insects were confused with roaches by the first serviceman is probably that both occur in the kitchen and pantry, and, obviously, because roaches are so common among household pests.

Flower or Carpet Beetles?

Many insect species are difficult to identify but most household pests can easily be placed in a general group, such as carpet beetles, clothes moths, or flour beetles. From the West Coast, a PCO reports another example of incorrect identification which occurred when a serviceman inspected a house for carpet beetles. The homeowner's maid pointed out several small, round, multi-colored beetles found crawling over rugs and window sills. When the serviceman said the bugs were only flower beetles that had flown in from nearby flower beds, the maid hastened to reassure her employer, who was quite relieved.

Luckily, samples of the insects were taken back to the office, where they were identified as furniture carpet beetles. After the homeowner was so informed, a complete re-inspection revealed carpet beetle larvae feeding on a rug beneath all four legs of an antique sofa along one living room wall. The PCO now had a very upset customer on his hands! Because of the initial mistake, she blamed the company for everything.

To protect his reputation and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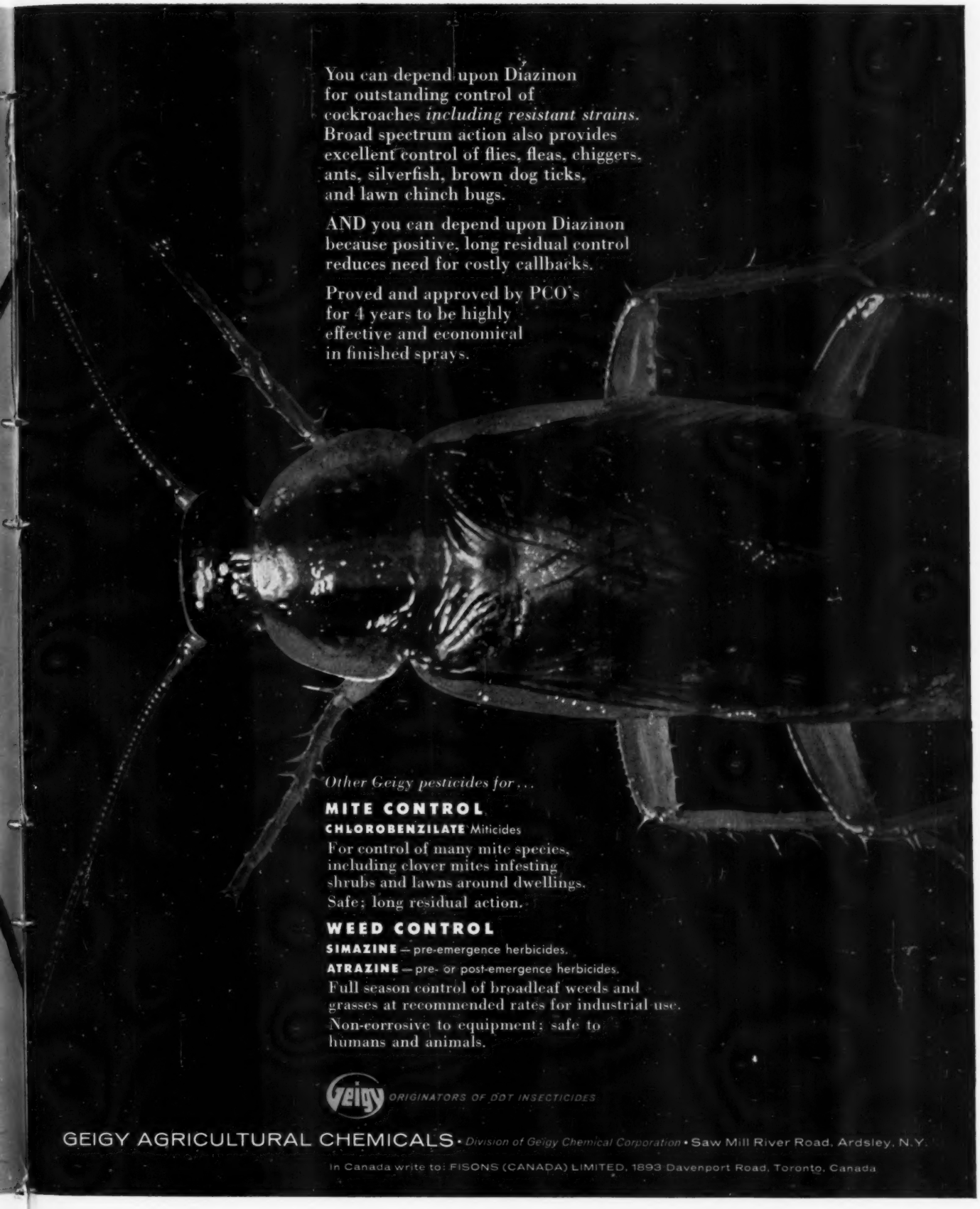
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regain customer goodwill, the PCO treated the carpet at a reduced price. He lost money because his serviceman, who had experience only with black carpet beetles, had never seen this particular species. If he had been taught that almost all carpet beetles have certain similar characteristics, this mistake could have been prevented.

Detective Work Advised

Identification of signs and damage caused by household pests is sometimes necessary to determine prevention and control measures. These signs should be as familiar to the serviceman as the pests are themselves. Rodent control often depends on familiarity with these clues because certain animals are seldom seen on a routine inspection unless the infestation is heavy. Only by recognition of the symptoms can servicemen diagnose the disease.

Importance of signs in rodent control is illustrated by a problem that arose in a New England food warehouse under contract for rodent control. Complete clean-out treatment had been made and good control obtained by a local PCO whose servicemen made bi-monthly inspections and baitings. Several months later, the warehouse manager told the operator that an FDA inspection uncovered a heavy infestation of mice. Immediate treatment was necessary, he warned, to prevent action by the government agency.

Indications were that signs of a slow mouse build-up had not been observed by servicemen assigned to the route. If they had identified droppings, tracks in the dust, and damaged sacks of food, re-infestation could have been avoided.

Brickwork Enigma

Interpretation of signs does not always have such serious results. In Chicago, a worried housewife called a local PCO to complain that the brick facing of her house contained pits which, she insisted, insects caused. The firm's service manager, making the rounds himself that day to help train a new man, examined the two-year-old house and found expensive brickwork riddled with cavities. Each tiny crater, about ¼ inch deep, was smooth and rounded inside; the outside had a thin edge and irregular shape. Close examination convinced the service manager insects were not responsible. He was fairly certain they were caused by expansion of small bubbles of air just beneath the brick surface, which he demonstrated by finding a thin place and pressing on it with his finger. Immediately, the thin film crumbled and a small, irregular depression was formed, just like the others. This evidence convinced the owner, who was greatly relieved to find insects were not at work in her walls.

This service manager knew that only under unusual conditions would any insect bore into a brick wall. And since his examination revealed no signs of insects, he correctly assumed some other culprit was responsible. In this instance, lack of infestation evidence solved the problem, a solution as worthy of charge as though spraying had been performed.

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to PCOs, and since misuse of chemicals often causes unsatisfactory treatment, knowledge of pesticides is also essential if servicemen are to conduct efficient operations.

A Virginia serviceman always used a pyrethrum fog on carpet beetle and clothes moth jobs, but several callbacks and repeated treatments led to an examination of his work. Although the fog was apparently doing a good job of controlling adult beetles and a fair job on larval stages, callbacks were almost always necessary. The problem was that no residual chemical had been applied, so that insects hatched after treatment were not being controlled. When a residual spray was used along with fogging, much better control was obtained.

Since the serviceman failed to realize pyrethrum is a knock-down agent with no residual value, his treatment was ineffective.

Not only must the serviceman guard against his pesticide's toxicity, but he must also prevent staining and discoloring of treated surfaces.

It is usually necessary, when treating for roaches, to avoid spraying easily stained areas, as one serviceman discovered when he treated door-facings in a vividly wallpapered room. He used a water-based spray, and explained that while wallpaper around doors would remain wet for a while after treatment, no discoloring would result when the paper dried. Several days later an irate housewife phoned the serviceman's boss and bellowed into his ear, in colorful language, that her wallpaper was streaked beyond repair. A supervisor went to see the angry woman, and found stains which, he was sure, were caused by his serviceman's treatment. The company paid for repapering the entire room.

Had the serviceman known water-base spray will stain wallpaper printed with water-soluble dyes, he would have used some other formulation. Many times a highly refined oil base is best because it is less likely to stain wallpaper.

Just as a serviceman must be familiar with properties of insecticide carriers to determine their effects, he must also know how to choose appropriate pesticides. DDT might be effective for control of oriental roaches, but useless on German roaches.

Ineffective Weed Job

Such a case occurred in a small town on the eastern seaboard, where owners of a steel warehouse called on a PCO to control grass and weeds in their outside storage yard. When the serviceman arrived he chose pentachlorophenol in oil and sprayed the entire area. Rapid browning of plants was noticed at first. During the next few weeks, however, weather was ideal for plant growth, and within a month weeds and grass were as high and as green as ever. Another treatment was necessary. Pentachlorophenol had burned leaves off the plants, but the roots were not killed, so new leaves grew in about three or four weeks. Several treatments were necessary throughout the summer to keep the grass under control.

Choice of another chemical would have brought better results,

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for some herbicides kill roots and destroy shoots as well. This PCO had only recently entered weed control, and his serviceman had inadequate knowledge of herbicides.

Proper Application

Since results obtained from chemicals vary with the method of their application, obviously PCOs must educate servicemen in correct application procedures as well as about the products themselves. An attempt to control German cockroaches by spraying Diazinon on kitchen floors only, will give no better results than spraying kitchen cabinets with DDT for carpet beetle control.

An example of incorrect application occurred recently when a serviceman treated for grass control in a large gravel parking lot. Grass was growing in spots where gravel was thin, and around many posts in the lot. Sodium arsenite was correctly chosen for the job, but a few weeks after application, grass was as much a problem as before, and persisted after second and third treatments. Supervisors from the firm investigated and discovered the serviceman was only wetting leaves when he should have been soaking the soil to kill roots.

Termites, too, may thrive where treatment is incomplete, as was evidenced in a job performed by a southern PCO whose crew treated a residence for control of subterraneans. A five-year guarantee was given, and yearly inspections were to be made to guard against termite infestations. Two years later, while working in his attic, the owner noticed a swarm of termites, and telephoned the PCO immediately. He was understandably upset! A crew arrived posthaste and discovered about 100 square feet of decking damaged by termites that had migrated up wall studs from a dirt-filled porch on the front of the house. In accordance with contract terms, the company had to replace damaged roof decking and roofing, a major expense that resulted from failure to treat the porch fill. Familiarity with construction types and treatment methods would have bypassed this needless, profit-sapping cost.

Learn Insect Habits

To round out a serviceman's knowledge of control measures, it is obvious he must learn insect habits, such as food preferences, places of shelter, and migratory patterns.

These few situations drive home what should be an obvious point: the scope and quality of a PCO's knowledge is only effective insofar as his men carry it out. No company will do every job correctly, but by anticipating mistakes when indoctrinating servicemen, supervisors can avoid costly callbacks and damage claims. In the end, after all, it is the serviceman who must make many small decisions which can determine success or failure of a job, and with it, the firm's reputation. Detailed training programs which foresee these problems, any of which is likely to crop up during a day in the field, will pave the way for decreased operating costs and higher profits.

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Unsuitable Termite Warranties Questioned at NPCA Convention

"FHA and VA demands that termite operators spell out what they are guaranteeing in their inspections for termite infestation or damage is the biggest problem facing this industry," E. P. Mace, Tulsa, Okla., told PCOs at the National Pest Control Association's October convention in Miami Beach, Fla. Mace, who operates Tulsa Pest Control Service, presided over the wood destroying organisms committee meeting which found delegates fired up over this warranty problem.

Lengthy debate over the responsibilities of such inspections at NPCA's Dallas Workshop in September ended in a draw (PC, October, '61, p.82), so PCOs tackled the problem again during the national conclave, when a more representative industry cross-section could take another look at the dilemma.

One TO described FHA and VA as "many headed monsters." If NPCA members do not tell these agencies what inspection reports will consist of, PCOs will find an inoperable and unrealistic code foisted on them by legislators, he said. Since conditions vary throughout the country, it is especially important to recommend a consistent, realistic certification form with widespread applicability, the delegate added.

Walter H. Wilson, of Wilson Exterminating Co., Winston-Salem, N. C., said his state has a standard form TOs must use when they examine real estate to give a termite clearance. PCOs from other areas said their states had similar forms.

Crux of the problem is in the vague use and understanding of the phrase, "termite clearance," a Florida TO complained. Comments from the floor indicated the term is usually applied to a report that says termites are not present in a building, and that the structure is undamaged by the insects.

PCOs Held Accountable

At this point, Wayne K. Davis, Ailing House Pest Service, Oakland, Calif., warned that TOs are often held responsible for later developments when such "clearances" are issued. Several representatives agreed, and asked, "How are we to determine what structural damage exists in places we or our inspectors find inaccessible?"

Alva H. Bender, of Bender Termite Control Co., Washington, D. C., said his firm includes a chart with inspection reports. This chart shows which areas were inspected, and which were not. "We accept no responsibility, and issue no opinions, about areas we cannot examine," he disclosed.

William J. Spitz, Big State Exterminating Co., Inc., Houston, Texas, compared PCOs' predicament with that of a physician who, after finding a patient in apparent good health, is asked to certify longevity. The delegation found this apt, and one member said opinions expressed by PCOs, as professional men, are in themselves valuable, and no further warranty is needed.

It was generally agreed that a fee should be charged for termite inspections, regardless of the nature of any clearances issued. "This industry must charge for a report, or else it is wasting its time," C. W. Fisher, of Paramount Pest Control Service, Portland, Oreg., summed up for the group.

Although outcome of this meeting, in contrast to the stalemated debate in Dallas, seemed to favor issuing no guaranteed warranty, no definite conclusions were reached. On the recommendation of Chester Schwimmer, Fumex Sanitation, Inc., Jamaica, N. Y., members of the wood destroying organisms committee decided to meet separately, on a regional basis, where the problem will be considered further.

$17 Million Lyctid Damage

Family Lyctidae occupied the committee's afternoon session, when Richard Moore, NPCA technical assistant, presented preliminary information gathered for a forthcoming association technical release on these pests, which, among wood destroying organisms, is second in importance only to termites.

Lyctids, or powder post beetles, account for $17 million damage

Spirited participation of conventioneers during NPCA's wood destroying organisms committee meeting was kept in order by (left to right): Richard T. Moore, NPCA technical assistant; E. P. Mace, Tulsa, Okla., who presided; and Dr. Philip J. Spear, NPCA technical director.

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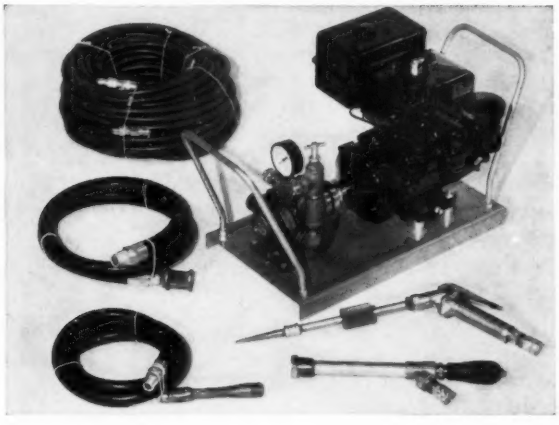

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Above: Model 56-A Pacemaker electric motor unit.

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annually in the United States alone, Moore said. Most vulnerable to infestation are hardwood floorings, structural timbers, plywood, and furniture, he pointed out, adding that bamboo products frequently transport these beetles into the country.

Moore characterized powder post beetles as slightly flat insects about 1/5" long, which range from reddish brown to chestnut to black. Through an ovipositor, adult females inject eggs into wood pores, and there larvae develop which bore through to the wood surface where they emerge as adults. Unlike termites, these insects do not feed on wood, but tunnel through it, leaving the fine flour-like frass which gives them their name.

Factors Affecting Lyctid Infestations

Lyctids attack moist, large-pored wood with high starch content, Moore revealed. These beetles are generally active in wood with from 10 to 20% moisture; there is no activity when the level rises above 32%, or falls below 8%, he went on. High starch content is important because lyctids feed on this substance, and are unable to digest cellulose. Female adults prefer to lay eggs in wood with 3% or more starch, Moore said, and wood with large pores is most susceptible to attack.

Infested wood has holes caused by emerging larvae, cracks which result from deterioration of wood, and powder frass made by the lyctids, he elaborated.

To prevent ingress of powder post beetles in wood open to attack, the speaker suggested PCOs seal wood pores with paraffin wax, shellac, varnish or paint. In rare instances, females can lay eggs by breaking through protective surfaces, he cautioned, although this usually occurs only when no other wood is present. Chemical preventatives can be applied by submerging wood in cold water emulsions or oil solutions of 5% DDT, .5% dieldrin or lindane, or 2% chlordane, Moore advised.

Control Toxicants

Control measures obviously depend on the severity of an infestation and likelihood of reinfestation, but treatment with residual chemicals is most desirable for localized trouble spots. Moore said applications of 5% DDT, 2% chlordane, .5% dieldrin or .5% lindane in deodorized kerosene are recommended for control of these wood-powderers, and added 5% pentachlorophenol is useful, although its objectionable odor is to be considered.

These formulations should be applied at the rate of 1 gal./100 sq. ft., by spraying or by brushing them directly on wood, Moore said, or by applying chemicals to unfinished floors with a mop. Finished floors pose a more complex problem. He prescribed use of a compressed air hand sprayer for these jobs, and suggested servicemen make succeeding applications after previously applied preservatives are absorbed. "Do not let chemical run through and stain ceiling or walls below," he cautioned.

Severe infestations call for fumigation, Moore reminded the group, although the disadvantages of high cost and no residual are the obvious limitations of this process. Methyl bromide is most common gas used, but some prefer hydrogen cyanide,

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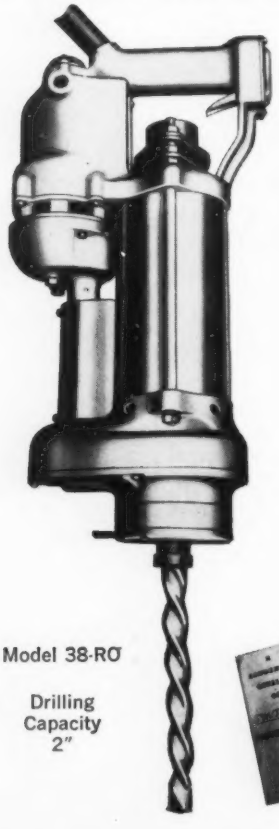

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he added. The technician specified 3 lbs. methyl bromide per 1000 cu. ft., or 2 lbs. HCN per 1000 cu. ft., and admitted that in certain cases of limited infestation, spot fumigations are sanctioned.

Parquet Floor Problem

Moore's discussion of special problems associated with lyctid control included parquet floors laid on slabs with adhesives. These can be critical because chemical solvents may cause sections of flooring to break away from the base.

Use of deodorized kerosene as toxicant carrier was questioned by Walter H. Samples, of Samples Exterminators, Dallas, Texas, who feels kerosene has a greasy effect on wood floors. "Good grades of deodorized kerosene will dry up in a few hours without adverse effect," another PCO countered.

One member asked if spot treating alone is ever sufficient, or if one must always fumigate. Spot treating has its place, a PCO replied, but even fumigation is not always successful. Another member said fumigation is the only method of controlling powder post beetles, and it was suggested that subsequent use of residuals might improve results obtained with gas. "One out of 10 methyl bromide fumigations is a failure," another TO maintained.

The group next focused its collective experience on problems of detecting powder post beetles. Presence of telltale holes left by the perforating pests was cited, and a delegate asked if lyctids ever make exit holes under the bottom of floors. Moore replied the cavities are not confined to a floor's upper side.

Old Beetle Holes Alarm Customers

"Does anyone have trouble finding whether control has been achieved?" Wayne Davis inquired. Several conceded this is a problem. "Customers see holes left by defunct infestations and think beetles are still in there," one PCO complained. "Is there always visible evidence of active infestation?"

Moore said powder is usually apparent when beetles are active, and another committeeman noticed that exit holes turn dark in a year or two, which enables the operator to decide there is an inactive infestation. Harry Katz, of Elco Manufacturing Co., Pittsburgh, Pa., said that even in cases where infestations are old, and holes dark, a little powder is apt to be given off when someone walks across the floor, or some other disturbance occurs. This could lead customers to think their infestation is still active, he added.

Powder post beetles infested a finished oak beam in an Arkansas living room, one conventioneer testified, where they were found coming out of the bottom but weren't on top. How should this be treated, he questioned.

Davis suggested, simply, that the beam be replaced with a new one. Another PCO said fumigation, using tarps, would do the job. It was also proposed the beam be wrapped in a cloth saturated with dieldrin-in-oil, and another member recommended injecting Woodtreat TC into the holes.

Lyctids Ride in on Imports

Importation of powder post beetles in bamboo products had been mentioned earlier, and in the discussion several delegates said they encountered the insects this way. Katz reported that many statues and art objects brought into the USA from Haiti and other countries are frequently loaded with lyctids. Another PCO agreed, and said he treats portable objects such as these Haitian statuettes right in his office, by dipping them into the toxicant and keeping them for a few days. Of course care must be taken to see that no discoloration of the object results.

"Has an X-ray technique for detecting beetle larvae been perfected?" an NPCAer wondered. He said he had heard of an English machine which reveals living organisms in wood, and which was 60% correct in spotting larvae, 90% right discovering adults.

Wayne Davis said the University of California Forest Insect Laboratory has a machine which can detect life inside wood products. PCOs showed great interest and wanted to know if this tool would be available soon for use in the field. Dr. Philip J. Spear, NPCA technical director, said that because of cumbersome size, and because of the extensive limitations on radiation, he doubted these techniques would be of practical value to the industry in the foreseeable future.

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What's NEWS In The Industry

USDA Tests Sterilize Flies; PCOs Question Industry Use

Several new chemicals that keep insects from reproducing could lead to improved control or eventually wipe out some of mankind's most troublesome pests, according to the U. S. Department of Agriculture.

Olin Mathieson Chemical Corp. announced to the general press recently that it has developed such a chemosterilant, called Apholate. The scientists discovered it causes sterility in houseflies which eat it or walk over treated surfaces, the company said. The flies live, but their eggs do not hatch.

Value of these new chemosterilants to PCOs is questioned by industry leaders interviewed by PC since the chemicals do not satisfy customer demands for immediate kill. Opinion is that these products will be useful mainly in area control, with limited applications in structures.

Entomologists of USDA's Agricultural Research Service believe chemosterilants have potential advantages over sterilizing radiation, which was used in the 1958-59 program for self-annihilation of the screw-worm in the Southeast.

In a preliminary field test on Bahia Honda Key, a small uninhabited Florida island, ARS scientists stationed at Orlando nearly eradicated a population of houseflies with a bait containing Apholate, Olin reports. After the bait was applied once weekly for five weeks in a heavily infested refuse dump, only a few flies could be found, and 80 to 98% of those captured were sterile.

As expected, USDA reports the Bahia Honda test area was soon repopulated with houseflies from nearby islands and the mainland. This might bear out PCO beliefs that these new chemosterilants have limited practicality in urban/industrial pest control.

USDA entomologists add, however, that a larger field test will be required on a remote island not subject to reinfestation, before their findings can be analyzed.

Olin has set 1964 as its tentative target date for commercial introduction of Apholate. The company gauges the market at $10 million yearly.

Members of a special committee who helped sponsor Houston Pest Control Association's recent short course, (PC, Sept. '61, pg. 50) given in 5 one-day sessions spread over six weeks, were (left to right): Frank G. Webb, American Exterminating Co.; Fred Rodeu, Charles Pest Control; and Joe D. Preston, Preston Exterminating Co., Inc. 89 registered for the course, given in cooperation with the entomology department of Texas A & M College.

Ritt Aids Purdue Research

Funds for research in entomology at Purdue University have been increased by a grant from Vogel-Ritt, Inc., Philadelphia, Pa., pest control firm, it was announced recently.

The donation, called the A. E. Ritt Research Endowment, is a continuing grant from which Purdue receives the earnings each year. The 1961 award is $3,000.

Dr. John V. Osmun, head of the university's entomology department, accepted this year's gift from A. E. Ritt, pres. of Vogel-Ritt, Inc.

Dr. H. L. Haller, USDA, Receives Spencer Award

Dr. Herbert L. Haller, research scientist credited with a major role in discovering and characterizing the first effective chemical insecticides, has been named 1961 winner of the Charles F. Spencer Award.

Kenneth A. Spencer, founder of the Spencer Chemical Co., established the award in memory of his father. Administered by the Kansas City Section of the American Chemical Society, the prize includes a medallion and $1000.

Dr. Haller is now Assistant to the Administrator of the Agricultural Research Service, U. S. Department of Agriculture. He received the citation for outstanding achievement in agricultural and food chemistry. Special emphasis was placed on his studies which lead to the development of rotenone and the pyrethrins.

Dr. H. L. Haller, 1961 winner of the Kenneth A. Spencer Award, has devoted his entire professional life to fields of research closely related to agricultural and food chemistry.

During World War II, Dr. Haller coordinated chemical research on insecticides and repellents for the armed forces. He holds numerous patents covering various natural and synthetic pesticides, and has been widely published in technical journals. Many of his articles were written especially for and published in *Pest Control*.

Local Groups to Sponsor Panels At '62 Eastern PCO Conference

A new approach to panel discussions will highlight the 1962 Eastern PCO Conference January 23-26 at the University of Massachusetts, Amherst. Each panel, limited to PCOs from the same area, will be sponsored by industrymen from New Jersey, New York City, Connecticut, and New England, according to conference co-chairman Dr. Frank R. Shaw of Mass. U's Department of Entomology and Plant Pathology.

Panel subjects and chairmen are: "Property Damage Hazards," David P. McAlindin, Royal Exterminators, Inc., Newark, N. J.; "Serviceman Training," Joseph Harris, Exterminating Industry Institute, New York City; "Equipment," Harry L. Bain, A-Bain & New England Exterminating Co.,

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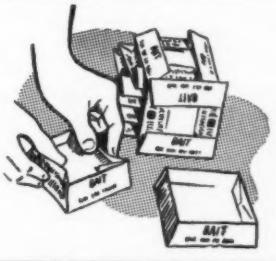

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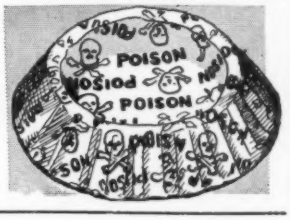

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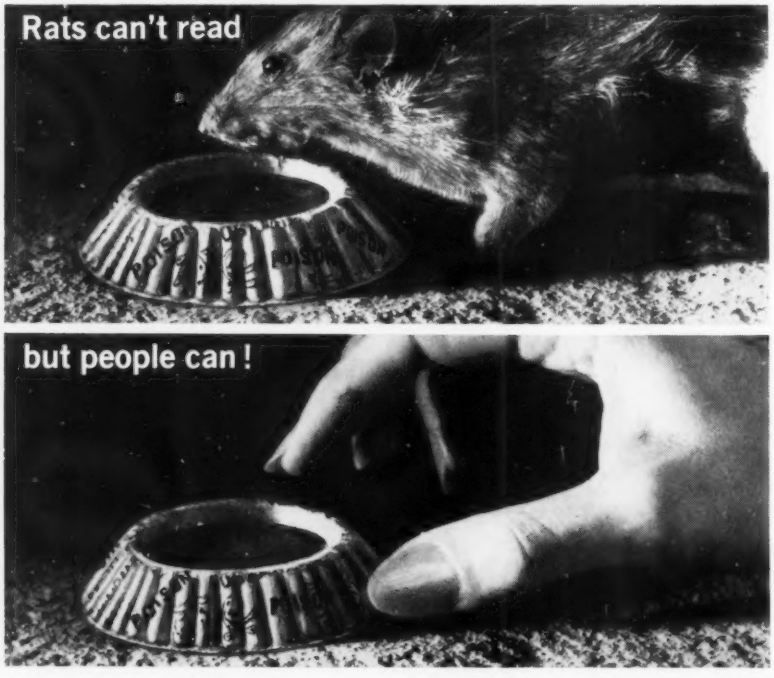
Conference opens at 1 PM January 23 with a session on termite control, followed that evening by a meeting of NPCA board of directors.

Thursday's session will consist of laboratory work with the "Pest of the Month" approach, Dr. Shaw revealed. Dr. Irwin Cochrun, Director of the Bureau of Business Management, University of Illinois, will address the group on Friday.

CSMA Poisons Laws Book Revised

A new edition of the Compilation of Economic Poisons Laws has been published by the Chemical Specialties Manufacturers Association.

Copies, priced at $27 to CSMA members and $48 to non-members, are available from the association at 50 E. 41st St., New York 17, N. Y.



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Preparing to buckle down for 4 years of study, William H. Lease (right), recipient of *Pest Control's* annual Purdue scholarship, receives helpful advice from Dr. John V. Osmun, head of the university's Department of Entomology.

William Lease Awarded Pest Control's Scholarship

Pest Control magazine's annual scholarship for students of pest control technology at Purdue University has been awarded to William H. Lease, of Peru, Indiana, who began his freshman year at the university this fall.

The fund provides $200 yearly for four years to an outstanding student whose major interest is structural pest control. Renewal of the scholarship is based on continuing interest and scholastic standing.

Lease was selected to receive the 1961-62 grant by representatives of Purdue's School of Agriculture, Department of Entomology, and Committee on Scholarships.

CSMA Proceedings Published

Over 50 technical papers are contained in the recently published Proceedings of the 47th midyear meeting of the Chemical Specialties Manufacturers Association held in May 1961.

Other subjects covered in the 221-page volume include disinfectants and sanitizers, waxes and floor finishes, automotive chemicals, and detergent and cleaning compounds.

The illustrated publication also contains speeches given before the association's general sessions by leading business and industry representatives.

Cost of the volume is $7.50 postpaid in the U. S. and Canada, and $8 in other countries. Order from the Secretary, Chemical Specialties Manufacturers Assn., Inc., 50 E. 41st St., New York 17, N. Y.

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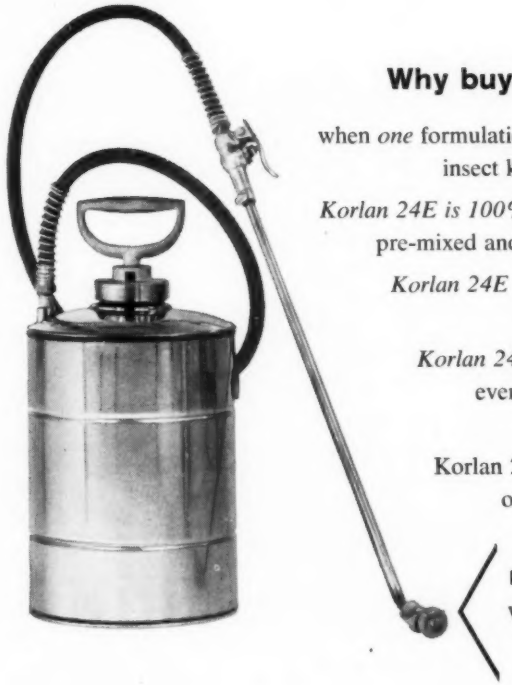

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Notebook

TIPS AND IDEAS FROM THE FIELD

Apple Trees and Clover Mites

by A. PESCOP

Last fall we were faced with a clover mite infestation in a fine old house of an elderly couple whose home was on the outskirts of town where they could have a little orchard. Over the years, their country homestead was engulfed by the expanding population. New houses were built all around and the neighborhood slowly took on the maturity that only time can bestow.

From all we had heard and read about clover mite troubles, our servicemen naturally associated them with newly planted lawns, usually those in recent housing developments. An inspection could not locate any of the tiny 8-legged, reddish creatures in the well-established grass that surrounded the Victorian home of our customer.

Where were the clover mites coming from?

To find the answer we searched the literature. Of the once bountiful apple orchard Mr. and Mrs. O. Laged had in their backyard, they had been able to keep two trees that were close to the house. Here was the source of our trouble.

Mr. Laged confirmed our belief when he told me he had noticed his apple trees looked yellowish, that the leaves were falling off earlier than usual, and that it had been a particularly dry summer. This fitted in exactly with what we had read. It seems that in dry seasons these mites sometimes do considerable damage to apples by sucking the sap of the buds and leaves. Infested foliage takes on a thin, yellowish appearance and during prolonged drought, many of the leaves fall from the trees.

Sometimes during the dormant stage of the tree one will find small reddish or pinkish eggs attached to the surface of the bark around the buds and tips of the twigs.

There are a number of generations throughout the growing season and, occasionally in the fall, these clover mites invade houses in large numbers. While they cause no damage inside the house, their presence is extremely annoying. That's why the Laged's phoned us.

We sprayed the foundation under windows on the outside and baseboard and floor areas inside with 0.25% DDT, left a pyrethrum aerosol for the folks to use if more mites showed up, and suggested they call in an arborist to treat the trees. So far we haven't gone into arborial and ornamental pest control work, but I'm becoming more and more aware of the market there is in these fields for professional PCO services. If I had been more familiar with pest control problems associated with trees, I could have more quickly recognized the probability that this particular infestation originated with the apple trees brushing up against the house.

New Chapin lawn and garden hose-end sprayer, is said to provide on-the-spot cleaning without tools. Chemical concentrate flows through the one-piece siphon tube direct to venturi, which prevents internal corrosion, the manufacturer claims. Jar is calibrated 1 to 6 gallons for liquid or wettable powder insecticides and fungicides. For more details on this and other Chapin products, ask for the company's 1962 catalog by writing R. E. Chapin Mfg. Works, Inc., Dept. PC 62, Batavia, N. Y.

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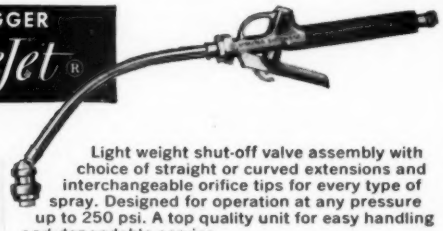

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Infestation Report

Contains pertinent portions of the Department of Agriculture's Cooperative Economic Insect Report, material from university entomology departments and reports from readers. PCOs noticing infestations in their own areas are urged to communicate with *Pest Control* so their information may be added to this infestation report.

AN ANOBIID
(*Hadrobregmus carinatus*)
Pennsylvania: Infested wooden antiques, floors and beams, mainly oak, in museums in West Overton; caused considerable damage.

IMPORTED FIRE ANT
(*Solenopsis saevissima richteri*)
Florida: 27 intensive infestations found in Polk County. **Louisiana:** Infestations found in Catahoula and La Salle Parishes. **Georgia:** Found in Pulaski County.

ANTS
Maryland: *Monomorium pharaonis* appeared in a building in Prince Georges County and *Acanthomyops interjectus* swarmed near a home in Montgomery County. **Oregon:** Winged forms of concern to homeowners in Willamette Valley.

CONFUSED FLOUR BEETLE
(*Tribolium confusum*)
South Dakota: Adults and immatures damaged stored foods in Hughes and Deuel Counties.

RED FLOUR BEETLE
(*Tribolium casteneum*)
Wyoming: Local adult infestations in stored grain in 5 granaries in Park, Big Horn, Hot Springs and Fremont Counties.

VARIED CARPET BEETLE
(*Anthrenus verbasci*)
Oregon: Abundant, with damage in homes in western areas.

LEAD CABLE BORER
(*Scobicia declivis*)
California: Medium infestation damaged draperies in home in Fresno.

PUSS CATERPILLAR
(*Megalopyge opercularis*)
Alabama: Young boy received local reaction from this species in Geneva County. **South Carolina:** Man experienced severe pain, stiffness in neck and paralysis from mandible to elbow as a result of contact with this species at Williston, Barnwell County. **Virginia:** Woman received local and systemic reaction from this species at Bayside, Princess Anne County.

DERMESTIDS
Oklahoma: Several species appeared in homes in Stillwater area.

AN EARWIG
(*Euborellia cincticollis*)
California: First record for this species for Butte County at Chico. Infested a yard in Palm Springs. **Georgia:** Infestation in a motel in Tifton.

EUROPEAN EARWIG
(*Forficula auricularia*)
Nevada: Entered homes, offices and stores in Elko, Elko County. **Utah:** Numerous and brought into homes on cut flowers in northern and central areas.

A FLEA
(*Ceratophyllus gallinae*)
Wisconsin: Found biting children in Oconto County.

CAT FLEA
(*Ctenocephalides felis*)
California: Very annoying household infestations in San Francisco Bay area.

MILLIPEDES
Illinois: Unidentified species very abundant in subdivision in Champaign, hundreds appeared in streets. **Kansas:** Caused concern entering homes and motels in Ellis County. **Louisiana:** Common in Baton Rouge area. **Nebraska:** Heavy numbers infesting homes in Lincoln and Lancaster Counties. **South Dakota:** Numerous in basements and other sheltered places in eastern area.

CLOVER MITE
(*Bryobia praetiosa*)
Wyoming: Caused nuisance in many homes in Laramie area, Albany County.

SILVERFISH
(*Lepisma saccharina*)
North Dakota: Severe infestation in commercial storage building in Fargo.

BLACK WIDOW SPIDER
(*Latrodectus mactans*)
Idaho: Generally abundant in Parma and vicinity. **Nevada:** Large numbers present, entering homes in Douglas County. **New Jersey:** Hundreds identified in steel yard. Destroyed by flame thrower wielded by Marines. **South Dakota:** Appeared in homes in Center City. **Utah:** Pestiferous in and around homes. Persons being hospitalized as result of bites.

SUBTERRANEAN TERMITES
Colorado: Infestations reported in Pueblo, Jefferson and Larimer Counties. **Maryland:** Infested home in Baltimore. **Minnesota:** Total of 22 properties found infested in St. Paul. New area of 12 infested properties found 3 miles from original infestation. **South Dakota:** Infested home in Davison County. **Utah:** Damaged home in Deweyville, Box Elder County. **Wyoming:** Second infestation of *Reticulitermes* sp. in city block at Riverton, Fremont County.

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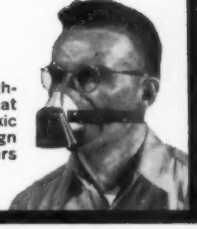

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Calendar

Dallas Pest Control Assn., Inc. Monthly Meeting and Election, El Chico Restaurant, Dallas, Tex., Dec. 14.

Pennsylvania Pest Control Assn. (Eastern Div.) Election Meeting, Shoyer's Restaurant, Philadelphia, Dec. 14.

PCOs of California, Inc. Cal-Poly Conference, Cal-Poly Institute, Pomona, Dec. 16.

Dallas Pest Control Assn., Inc. Monthly Meeting, El Chico Restaurant, Dallas, Texas, Jan. 11.

Southern PCO Conference, Monteleone Hotel, New Orleans, La., Jan. 15-17, 1962.

Maryland Pest Control Assn. Election Meeting, Lord Baltimore Hotel, Baltimore, January 17.

Arizona Pest Control Assn. 3rd Annual Seminar and Election Meeting, University of Arizona, Tucson, Jan. 19-20.

26th Annual Purdue PCO Conference, Purdue University, Lafayette, Ind., Jan. 22-26.

Hawaiian Pest Control Assn. Monthly Meeting, Queens Surf, Honolulu, Jan. 23.

Eastern PCO Conference, University of Massachusetts, Amherst, Mass., Jan. 24-26.

California Mosquito Control Assn. Meeting, San Mateo, Jan. 29-31.

North Carolina State College PCO Short Course, Student Union Bldg., Raleigh, N.C., Jan. 31-Feb. 1.

North Carolina Pest Control Assn. Election Meeting, Student Union Bldg., N. C. State College, Raleigh, Jan. 31-Feb. 1.

California Pest Control Assn. Annual Convention, Huntington Sheraton Hotel, Pasadena, Feb. 1-3.

Vertebrate Pest Control Conference, Senator Hotel, Sacramento, Calif., Feb. 6-7.

Dallas Pest Control Assn., Inc., Monthly Meeting, El Chico Restaurant, Dallas, Tex., Feb. 8.

Pennsylvania Pest Control Assn. (Eastern Div.) Monthly Meeting, Shoyer's Restaurant, Philadelphia, Pa., Feb. 8.

Epidemiology and Control of Vector-Borne Diseases Course, Communicable Disease Center, Atlanta 22, Feb. 12-16.

Aquatic Weed Control Society 3rd Annual Meeting, LaSalle Hotel, Chicago, Feb. 13-14.

Virginia Mosquito Control Assn. Meeting, Norfolk, Feb. 23.

Hawaiian Pest Control Assn. Monthly Meeting, The Willows Restaurant, Honolulu, Feb. 27.

American Mosquito Control Assn., Joint Meeting with Texas Mosquito Control Assn., Galveston, Mar. 5-7.

Pennsylvania Pest Control Assn. Short Course, Pennsylvania State University, State College, Pa., Mar. 6-8.

Sanitarians of Ohio Convention, Neil House, Columbus, Mar. 9-10.

Michigan State University PCO Conference, Kellogg Center, East Lansing, Mar. 15-16.

Utah Mosquito Abatement Assn. 14th Annual Meeting, Salt Lake City, Mar. 16-17.

New Jersey Mosquito Extermination Assn., Annual Meeting, Hotel Chalfonte-Haddon Hall, Atlantic City, N. J., March 21-23.

Illinois Mosquito Control Assn. Annual Meeting, Dixie Governor Motel, East Hazelcrest, Mar. 30-31.

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Handy, alphabetical reference of subjects and titles of all major feature articles, feature columns, news stories, letters, editorials published in *Pest Control* in 1961. A list of authors of this year's articles follows the index.

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NON-TOXIC provides a positive kill of all types of roaches including Oriental and resistant German roaches. Practically free from odor. Meets M.I.D. requirements and recommended for use in packing plants, restaurants, bakeries, food warehouses and homes.

Repellent 11

NON-TOXIC. Recommended for use with Roach Concentrate 933 as it provides excellent residual protection up to four weeks. This combination effectively kills roaches and repels them and when used as directed is non-toxic.

Dipterex*

This is a water soluble powder which combines a high initial kill of both resistant and non-resistant roaches with a residual control of several weeks. Practically odorless, it is very popular with professional pest control operators.

**Trademark of Farbenfabriken Bayer A. G. inventor and licensor to Chemagro Corporation.*

Ronnel 6

Ronnel 6 effectively controls roaches, flies, gnats, moths, wasps, bedbugs and carpet beetles. Extremely toxic to insects, it has a low toxicity to man. Perfect for aerosols and pressure sprays. Stable, effective, and reasonably low in cost.

MGK McLAUGHLIN GORMLEY KING *Company*

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- ☐ Roach Concentrate 933
- ☐ Repellent 11
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1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Trade Magazines, Incorporated, 1900 Euclid Avenue, Cleveland 15, Ohio; Editor, James A. Nelson, 1900 Euclid Avenue, Cleveland 15, Ohio; Managing editor and business manager, none

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JAMES A. NELSON, Publisher

Sworn to and subscribed before me this 3rd day of October, 1961.

ROBERT E. HAGAR, Notary Public
My commission expires October 3, 1964

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Mich. PCOs Set Inspection Fees

A minimum fee of $10 for the first hour and $5 for every additional hour on all VA and FHA termite inspections that require certification was voted by members of the Michigan Pest Control Operators Association during its October 6 meeting at the Albert Pick Motel, Lansing.

In other business during the all-day Friday meeting, association president Harvey Montgomery told delegates that field tests with Bayer 29493, now known as Entex, have shown slow action and long residual effects, killing flies after 40 days. "Mixed with DDVP, Entex shows great possibilities," Montgomery said.

Delegates discussed a widely circulated periodical which recently editorialized about the effects of pesticides on birds and wildlife. Professors Julius Hoffman and Ray Hutson, both of Michigan State University, advised the group to discontinue fighting such editorials despite their damaging effect on the industry. Such fights are a waste of time and draw added public attention to this kind of negative publicity, it was said.

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Feeds 1 Full Quart Of Liquid Bait And More Than 6 Pounds Of Dry Bait

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FREE AUTOMATIC LIQUID DISPENSER WITH EACH RAT CAFETERIA

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Today's largest-selling bait station. Approved by health authorities everywhere. Fabricated of heavy galvanized steel. Many report over 5 years of continuous use. No identification. Imprint your name.

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MARTINDALE

DUST MASKS

ONLY **30c** each

PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN

PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS

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Real Protection at Low Cost

So easy to wear, yet large filter area gives positive protection against over 400 nuisance dusts. Easy press-fit contour adjustment. Fits any head size, weighs less than ½ ounce. Replaceable throw-away filter pads — only clean gauze touches the face. Satisfied users everywhere.

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Masks packed in individual envelopes. Refills packed 25 to a box. Minimum charge or C.O.D., $2.00. Minimum cash with order, $1.00. Postage paid on all cash orders.

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ALSO MOTH-CLOUD and BUG-TAB TABLETS

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Pestales

Reflections on the NPCA convention this year . . . Just about every one of the better than 600 delegates decided the Deauville Hotel in Miami Beach was the most beautiful spot ever to house the association's conclave. Only mishap was when the electricity went off in the hotel. Naturally everything run by electricity stopped, including the automatic elevators. Unfortunately, two of our ladies, Ann Veatch (wife of Wood Treating Chemicals sales manager, John Veatch of St. Louis) and Alice Chrissman (W-T's district sales manager Bill Chrissman's wife; they're from Libertyville, Ill.) were trapped for a whole hour in the dark, between floors. Ohio Valley Terminix man, Dean Fulton and his wife from Evansville, Ind., heard the girls ask for air and were successful in prying doors of the elevator open to let in some light as well as air. Fortunately, Ann and Alice were in their bathing suits, having just come from the pool, so their 60-minute entrapment and perspiration didn't ruin any of their clothes. Both of the Fultons talked to the girls for nearly 45 minutes, joking and reassuring them until the lights were turned on again and the elevator could move up to floor level . . . Ralph Heal, NPCA secretary, was surprised with a cake on Sunday, Oct. 15th, to mark his birthday . . . T. Roy Young of Tampa, Fla., who never wears a tie, except on state occasions, such as at the annual banquet Thursday night, won out over a rule of the hotel which requires guests to wear a coat and tie after 6 p.m. Some fur flew for a few minutes there, but Roy's conviction won out . . . Just about 200 went over to Nassau for the convention extension program to hear Justus Ward, USDA pesticide regulation official, at the British Colonial Hotel. Nearly 50% of those who made the trip forewent the sunshine and beauties of Nassau to listen to Justus give an excellent address (which we'll publish in January) and to take part in the open discussion that followed . . . Never realized we had so many versatile dancers in the group. They danced to the Calypso music like natives at the Cat and The Fiddle, popular Nassau open-air nite spot. Spotted on the floor were Mr. & Mrs. J. Edwin Sameth from Newark, Mr. & Mrs. Bill Pickhardt of Buffalo, Mr. & Mrs. Jim Sims of Montgomery, Ala., and scores of others who won't admit they have this talent. Wonder how many tried to do the limbo when they got home? . . . Did you know Mrs. Arthur Hammel is quite a helmslady? She guided the Catamaran during most of its 4-hour sightseeing trip around Hog Island off Nassau . . . The straw market extracted dollars from almost every delegate's pocket to pay for bags, ordinary hats, and those fantastic, colorful versions like the one being held by Mr. & Mrs. J. Harvey Sturgeon shown in the picture above . . . A pair of U.S. submarines were in the harbor during the PCO visit to the Bahamian island and one was open for inspection. Some delegates had eaten so many goodies at Pumpernick's (oh, those whip cream pies and cakes!) that they were unable to squeeze through the narrow entrance-ways of these sea serpents. But one of those who were able to climb up and down and through the passageways remarked that drywood termites in the sub's furniture might be confused with "sub" termites! Think it was Bill Crosby of Pittsburgh who said that. Maybe he wishes he hadn't . . . While most of the delegates were either on their way home or to Nassau Friday morning, the NPCA board of directors was meeting at The Deauville to pick the '61-'62 Executive Board. Chosen to serve with president-elect Charlie Houghton, and past-prexy Maury Oser, were Bill Elo of San Antonio, Tex., Stan McKenzie of Lake Charles, La., and Lee Truman of Indianapolis . . . with such important business out of the way, they, too, took the plane to Nassau . . . With the Bahama extension just passed, there are those who are rooting for an extension to Hawaii in '63 when the convention is held in San Francisco? Anyone know where we can find a goldmine between now and then?

The Harvey Sturgeons, from Louisville, in Nassau.

The Most Powerful

Fumigant

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It eliminates infestation of grain, tobacco, plant beds, seeds, dried fruits, cereals, nuts and a wide variety of other products.

Kolker Methyl Bromide economically and quickly kills insects, mites, nematodes and related pests in all stages of their development.

Non-explosive and non-flammable, Kolker Methyl Bromide leaves no residual odors, tastes or stains, when used as directed.

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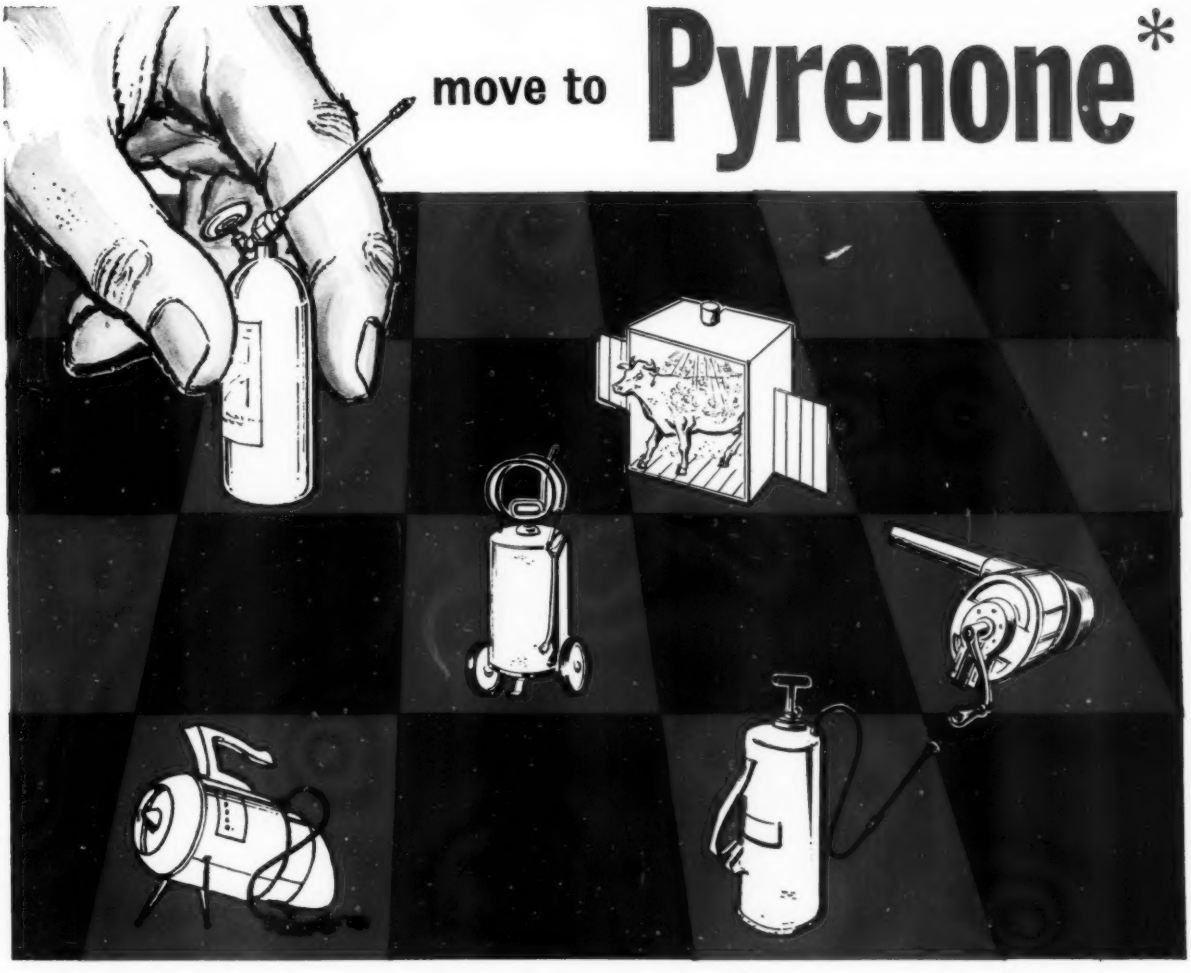

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Known as Fairfield Pyrenone, this combination spells quality. It assures the farmer, PCO, sanitarian and plant maintenance man of peak performance—the fast knockdown and kill found only in superior products—plus unique safety.

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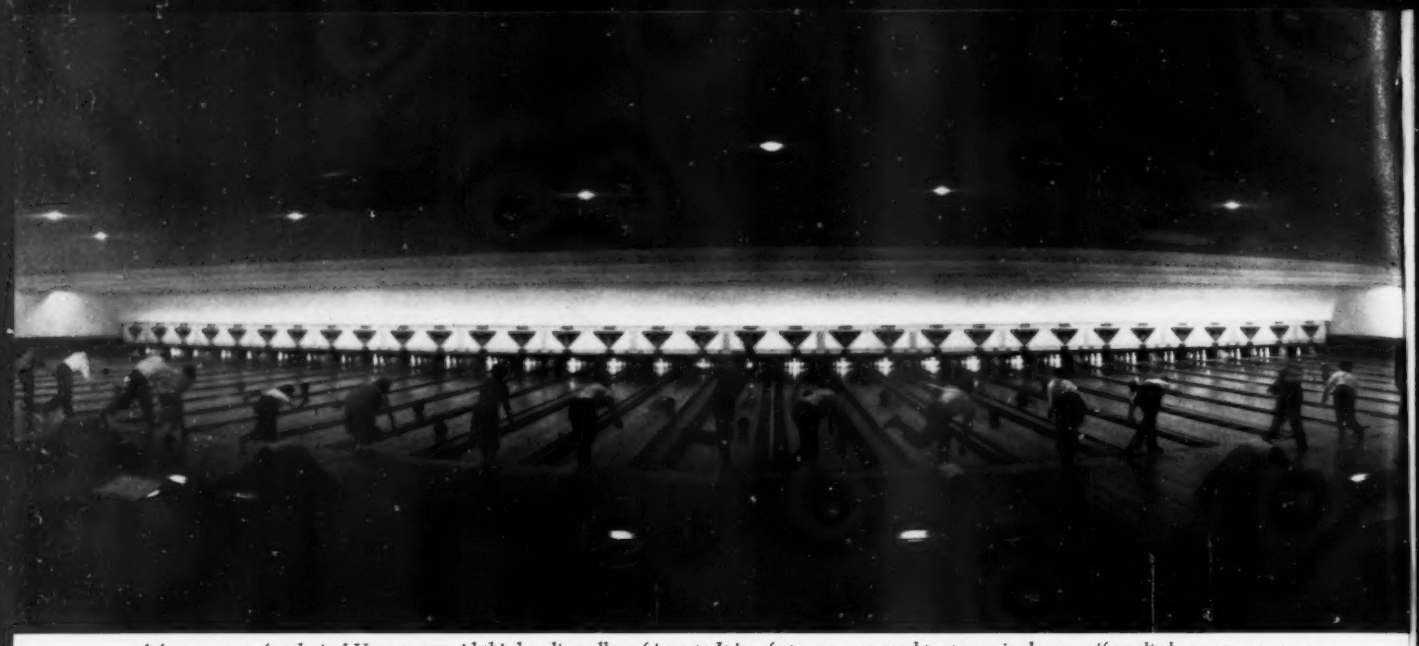

A few ounces of technical Vapona can rid this bowling alley of insects. It is safe to use—no need to stop a single game if applied as a coarse spray.

ANNOUNCEMENT:

A few ounces of remarkable new Vapona® Insecticide (technical DDVP) can make this 265,320 cubic-foot bowling alley free of annoying insects

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Vapona knocks down and kills insects within a few minutes of application. Then, it disappears rapidly with ordinary ventilation.

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